ADVERTISING PAGES REMOVED

IT'S IN THE BAG

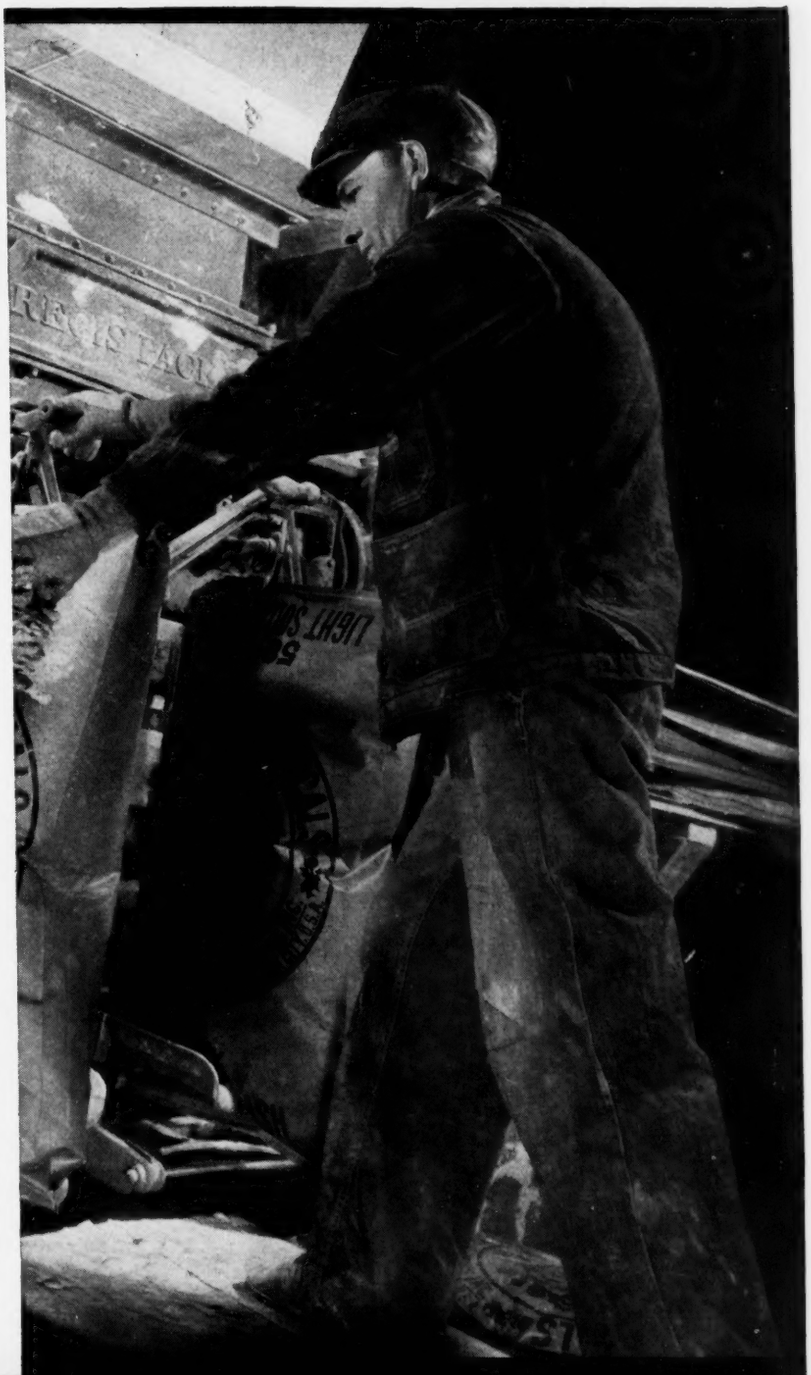
A fine white powder flows from the hopper . . . down through modern packaging machinery . . . on into a sturdy container. Operator Sargent Griffin pulls a lever . . . and another bag of Mathieson Soda Ash starts on its way to American Industry.

●

WHETHER the soda ash you buy represents a major raw material purchase or is merely incidental, you use care in selecting your source of supply. First, of course, you ask the natural questions about quality, price and delivery. But you also want to know something about the company with which you are to deal—its policies, its resources, its facilities for rendering service.

"Mathieson Chemicals" is a 36-page booklet designed to furnish you with usable buying information and to give you an opportunity to examine the background of the Mathieson organization. It contains a brief history of the company, concise product and package specifications, flow charts, plant photographs and other interesting material.

If you would like to have a copy of this booklet, just write to The Mathieson Alkali Works (Inc.), 60 East 42nd Street, New York, N. Y.



MATHIESON CHEMICALS

SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER HTH AND HTH-15 . . . AMMONIA, ANHYDROUS AND AQUA . . . PH-PLUS (FUSED ALKALI) . . . SULPHUR CHLORIDE CCH (INDUSTRIAL HYPOCHLORITE) . . . DRY ICE (CARBON DIOXIDE ICE) . . . ANALYTICAL SODIUM CHLORITE

The Reader Writes:—

Crossing the Red Lights

Congratulations on the word of warning contained in your editorial of March on "How Many Chemists." Perhaps we should not be unduly scared yet, but it is certainly healthy to start thinking about it.

May I say that the situation is really worse than you painted it. Perhaps you purposely underemphasized the situation by omitting to remind us that pretty soon it will not be necessary "to throw a switch when the indicator crosses a red light" for the simple reason that the throwing of the switch will also become automatic.

State College, Pa. — Frank C. Whitmore

Wants to Invest an Extra Dollar

It may sound foolish to some people for me to say so, and you, no doubt, would regard with a great deal of skepticism the suggestion, but I think you are selling your magazine too cheaply. I don't know of any way I could invest another dollar or two to better advantage than to have you work with it to increase the scope and size of your activities.

Inglewood, Calif. — E. M. Noll, Noll Chemical Co.

Eyes on Mars

Your current issue ranges from Cape Town to Hudson's Bay, which it would seem is broad enough to satisfy any reader's expectation. If you enlarge the scope, I will have to turn my optics on Mars, and, frankly, I have no interest there, so my check for renewing my subscription is cheerfully enclosed.

Newark, N. J. — Ramon E. Ozias

Thanks

Of the many trade publications which we receive, we consider Chemical Industries the best that comes into our office.

Cleveland, O. — M. J. Murphy, President, The Murphy-Phoenix Co.

Indirect Tariff Effects

I am neither a statistical nor tariff expert and it would require one who was well versed in both to prove the point I want to call to your attention.

Chemicals are mostly used in manufacturing and they enter accordingly into the costs of practically all manufactured wares. In this way we import chemicals indirectly, and while such "bidden imports" would be very small in many consumer goods, nevertheless they become a considerable item in Celluloid or perfumery or in goods of leather, paper, glass, woolens and rayon, rubber, etc., in the processing of which chemicals enter largely.

It occurs to me that some careful statistical studies ought to be made of the effect of the so-called reciprocity trade agreements upon the American chemical industry along these lines. If we import paper in what-so-ever form that replaces American-made paper goods, we are going to sell just so much less bleach, alum, sulfuric acid, caustic soda, etc., etc., used by our domestic paper industry.

For example, I read in the papers that the new tariff treaty with Czechoslovakia is going to seriously affect our shoe industry which is a large, indirect consumer of chemicals through the tanning process. Glancing over the provisions of that treaty, as summarized in the *Journal of Commerce,* I note that the only direct concession made to American chemicals is a raising of the duty free quota on sodium nitrate from 2,000 to 3,000 tons, for the promise to keep naval stores, phosphate rock, borax, carbon black, and crude sulfur on the free list is no change at all and not the least sacrifice.

The point I want to make is that we ought to know what a thousand tons of sodium nitrate, which I believe is only produced by one American company, means as against the chemicals in the increased imports of pairs of shoes. No doubt I have over-simplified the problem; but do I make my point clear?

New York City — Howell Cook

A Lot of Territory

Your subscriber who considers Chemical Industries as the *Fortune* and *Life* of all chemical publications was too modest. To me you are the *Bible* and *Pic.*

Worcester, Mass. — Hurley T. Burke

You may be the *Fortune* and *Life* of the chemical industry to Mr. Meyer, but to me you are a pain in the neck, because:

1. You support the American chemical industry, right or wrong—and it is so often wrong.
2. You criticize the New Deal right or wrong—and it is usually right.
3. Your news is a stale imitation of *Time.*
4. Your illustrations are beautiful, but dumb.

Baltimore, Md. — Arthur Burton

This Makes It Unanimous

"Why Chemists Get Fired," etc., is good stuff, the most interesting chemical reading I have done this year and the most illuminating.

Sandusky, Ohio — Peter Drewsen

Comprehensive Adjectives

You are publishing what has become the most worthwhile and informative journal in the industrial chemical field.

Chattanooga, Tenn. — Andrew J. Kelly

They Might Do Worse

American Cyanamid has bought up pretty nearly everything chemical in sight, and with the pictures from the Stamford Laboratories in January, and Dr. Landis' snappy African photographs last month, some of us are beginning to wonder whether they have not acquired your Roto Section.

Baltimore, Md. — R. S. Quinlan

Jack Sprat and Wife

Thanks for collecting all those dry-as-dust statistics in a separate section which I can now so easily throw in the waste-basket.

Boston, Mass. — Henry T. Dunn

The blue Data Section is great stuff. I am filing the pages by subject in a loose leaf binder.

Orange, N. J. — Wm. H. Whitman

CHEMICAL INDUSTRIES

The Chemical Business Magazine

Consulting Editorial Board
R. T. Baldwin, L. W. Bass, F. M. Becket, B. T. Brooks, J. V. N. Dorr, C. R. Downs, W. M. Grosvenor, W. S. Landis, and M. C. Whitaker.

ADVERTISING PAGES REMOVED

Reichsforschungsrat

THIS is the bureau under Artillery-General Professor Doctor K. Becker which has organized all German science into fourteen departments to the end that research shall become the servant of the State. As an example of systematized energy the Reichsforschungsrat, planned and executed within three months, is a typically Teutonic triumph with its councillors and its deputies and its itemized departments all under the Ministry of Learning, Training, and National Education. As for its aims and objects let the Minister speak for the Führer:

"Not long ago many of us felt that learning ('Wissenschaft') was too aloof from the great decisions of our time to cooperate in the great struggle of the German people. But the course of German history has itself brought this idyllic attitude to an end and with it has ended also certain idyllic forms of scientific work. The Nazi Revolution summoned science to the decisive battle.

"Complete freedom of opinion and judgment are not marks of a truly free science, but rather of an estrangement of the spirit from the eternal forces of Nature and of history. . . . Freedom is assured to science neither by its abstractness nor by its independence of current events. . . . It is rather the hopes of the German people and of the Nazi State in the share of science in the Four Year Plan. . . . that give proof of the recognition of the freedom of science.

"If the Nazi State calls on German science to cooperate in the Four Year Plan, it is not because it anticipates the findings of science, but because the first task of science will be to give us those materials which Nature has denied us. Such a task can only be accomplished by free science. For science is unfree if her findings be dictated by an unscientific force, but she is free if she sovereignly masters those problems which are posed to her by life. . . . With the foundation of this Council no new principle of scientific behaviour is introduced."

Here too, is a great triumph of the German spirit, a victory of sophistry and mendacity—that is, unless we are to believe that Reichsminister Rust is an Aryan quite devoid of intelligence and a sense of humor.

Williams Haynes, Publisher and Editor; A. M. Corbet, and W. J. Murphy, Associate Editors; W. F. George, Advertising Manager; D. O. Haynes, Subscription Manager; J. H. Burt, Production Manager.

Out of the Mouth of Babes — A stripling of seventeen arose at the Dallas meeting of the A. C. S. and told some homely truths about the plethora of badly written technical papers with which the literature is cluttered year after year. He spoke out boldly in much the same vein in which many older men have complained privately, and we forgive his turning the adjective 'human' into a noun for this sane summary of an old-standing evil:

"Scientists are still humans, and they cannot experience an emotional thrill over an article entitled 'A Short Dissertation on the Effects of Alcoholic Tincture of Rotenone in the Control of Thrips on Six-weeks Old Spinach Plants in Richmond and Queens Boroughs,' especially if the article concludes, as is often the case, that the tincture has no material effect on the thrips, except as it destroys their food by killing the spinach."

Chemical Economics We should be less than human if we were not pleased that the National Research Council is at long last to organize a section to further the better interest of that extremely interesting hybrid study of chemical economics. The industry and the science of chemistry can only gain from a better alliance with economists, for there is opened up here an interchange of ideas that cannot but be stimulating to both. Too long have competent authorities in both subjects ignored the work in the other field.

Practical results may be reasonably expected in better chemical statistics and in a sounder comprehension of the economic foundation of chemical production and distribution. On the other hand, a more sympathetic understanding of chemical industry by professional economists will go a long, long way towards winning for this industry the recognition that its fundamental place in our modern life so well deserves. At the moment, the economists are held in low repute; but this is unfair since a majority of the sound thinkers among them, if they have proved to be no better prophets than the politicians and the businessmen, have shown themselves to be much more successful analysts of cause and effect. It would be unwise indeed to liquidate the whole profession for the folly of a few.

Earning Power It is not easy to determine the earning capacity of an operating chemical company on the basis of its invested capital. Yet, if practical, this would furnish a most usable yardstick of industrial efficiency. An interesting substitute has recently been applied to half a dozen leading chemical corporations by a Wall Street house which has presented a vivid picture of chemical earning power by assuming the purchase of 100 shares of stock December 21, 1926, at the then market price, by adding together all stock dividends, split ups, and stock subscription rights, and multiplying the earning per share by common stock each year by the number of shares which would be held. If not an accurate reflection of earnings on capital investment, these figures do furnish an accurate determination of the earnings by the company on the capital invested by the shareholder.

The record is exceedingly interesting and notably gratifying:

	Number of Shares	*Cost*	*Earnings % of Cost*
Air Reduction			
1926	100	$13,900	7.8%
1937	900	13,900	18.5
Allied Chemical & Dye			
1926	100	13,600	7.2
1937	110	13,600	9.1
American Cyanamid "B"			
1926	100	3,500	10.0
1937	450	12,000	7.8
Du Pont			
1926	100	17,700	7.9
1936	361	18,210	14.5
Monsanto			
1927*	161	3,400	28.9
1936	981	9,890	43.6
Union Carbide			
1926	100	10,037	9.0
1937	324	11,957	12.9

* Not listed New York Stock Exchange, 1926.

Obviously, earnings percentage in the last column do not reflect the relative earnings or attractiveness of the securities today since that percentage figure is determined largely by whether the original purchase price was high or low in relation to earning power at that time.

Moody's by taking the per share earnings ratio to a 1928-30 average have arrived at a set of figures that are interestingly comparable:

	1927	1937	c	e
	%	%	%	%
Air Reduction	58	137	9.1	4.0
Allied Chemical & Dye	91	105	1.4	0.7
American Cyanamid "B"	..	f112	..	b1.6
DuPont (g)	61	188	11.9	8.2
Monsanto Chemical Co.	71	408	19.0	19.2
Union Carbide	89	132	4.1	3.5

b-1930-37 period. c-Annual compounded growth rate, 1927 to 1937 of per share earnings, on basis of present capitalization. e-Annual compounded growth rate, 1928-30 to 1937 of per share earnings, on basis of present capitalization. f-In relation to 1930 earnings. g-Excluding General Motors.

Both trend-statistics confirm the operating efficiency and managerial skill during ten difficult years of these chemical firms.

Possible Uses of the
Resin-Wax Combinations

By R. W. Allan

Research and Development Laboratories, American Gum Importers Association

RESIN-WAX combinations find application in paper coating, sizing, or impregnation; transfer inks; metal food or beverage container linings; floor, furniture, or automobile polishes; molding compositions; candles, waterproofing compounds, and other industries. The uses of these mixtures have not as yet been extensively explored; and these data are presented as preliminary information for those industries interested in these waxes or resin-wax combinations. That interest may be from the viewpoint of the material itself or from an economic angle. Carnauba, beeswax, and ozokerite will definitely reduce the cost of raw materials.

From time to time the laboratory of the American Gum Importers Association, Inc., has published basic information on the various natural resins and their commercial applications, the results of their findings over a period of years. Following is a continuation of such fundamental study, dealing with the combination of natural resins and numerous commercially important waxes. Our study included various natural resins combined with carnauba wax (No. 1 yellow), Japan wax (Chickusan), montan wax (crude), ozokerite (natural yellow), beeswax (pure crude), and paraffin wax. The first two are of vegetable origin; montan and ozokerite are related to the lignites; beeswax is a secretion of the common honeybee, and paraffin is obtained in the refining of crude petroleum.

Results thus far obtained indicate that the natural resins in general may be completely soluble in the waxes studied, although certain of the fossil resins, whether raw or in the "run" condition, and some Manila resins, are not completely compatible with paraffin wax. "Running" or thermal processing involves melting of the resins with the distillation of volatile oils terpenic in nature.

In the experiments conducted, the wax was melted in a tared beaker and an equal weight of resin added slowly, with constant stirring. Agitation was continued until the mixture was thoroughly homogeneous. The combining temperature was recorded and the beaker and contents weighed to determine the loss in weight. The mixture was then cast into a small tin plate and, when cool, its melting point taken.

Melting points on all mixtures were determined by the mercury method adopted by the American Gum Importers Association, Inc. Some small pieces were gently sintered to the bottom of a wide form porcelain crucible of about 17 cc. capacity. Approximately 100 grams of mercury, previously heated to about 30° C. below the probable melting point of the sample, were poured into the crucible and a thermometer was immersed in the mercury. The crucible was heated slowly (2°–4° C. per minute). The temperature at which the first bit of the sample appeared above the surface of the mercury was recorded as the melting point.

Melting points of the waxes were run by the same method. These had already been obtained for the resins* and are included in Table I.

Table of Melting Points

	Melting Point, ° C.
Resins	
Batavia Damar A	99–102
Batavia Damar B	96–100
Singapore Damar No. 2	114
Bold Black Scraped East India	160–164
Batu Scraped	169
Pale East India Macassar Bold	127–156
Pale East India Singapore Bold	147–156
Manila MA	121
Loba C	114–123
Congo No. 4	178
Congo No. 11	193–200
Kauri Pale No. 1	128
Run Brown Kauri No. 2	120–130
Elemi	Plastic
Wax	
Beeswax (Pure Crude)	61.5
Carnauba (No. 1 Yellow)	80
Japan (Chickusan)	43
Montan (Crude)	68
Ozokerite (Natural Yellow)	49
Paraffin	49

Detailed results obtained in producing the different mixtures are tabulated next page. The first column gives the resin and wax which were combined. In this connection it is to be remembered that equal parts of resin and wax were used. The second column shows the temperature at which combination took place. In some cases it was necessary to raise this temperature to the range of "running" of the resin before the latter would dissolve in the wax with reasonable rapidity. However, it is probable that the desired mixture could be obtained at lower temperatures, given a greater length of time. The third column indicates the resultant loss in weight and is the total loss of resin and wax on heating at the combining temperature. Melting points of the various combinations are given in the last column. These were determined by the mercury method previously described.

* "Natural Resins for 1937-1938," American Gum Importers Association, Inc.

It may be seen from the data below that, except in the case of Elemi-wax mixtures, addition of resin to the wax usually raises its melting point. Elemi, while lowering the melting point, acts as a plasticizer.

Data on Resin-Wax Mixtures Mixture	Combining Temperature, ° C.	Loss in Weight, Per cent.	Melting Point, ° C.
Batavia Damar B & Beeswax	90–100	.4	59.5
Batavia Damar B & Carnauba....	90–100	1	66
Batavia Damar B & Japan.....	90–100	0	47
Batavia Damar B & Montan	90–100	.4	76
Batavia Damar B & Ozokerite ...	90–100	0	64
Batavia Damar B & Paraffin	140–150	.5	49
Bold Black Scraped E. I. & Beeswax	130–140	.6	65
Bold Black Scraped E. I. & Carnauba	130–140	2	82.5
Bold Black Scraped E. I. & Japan	130–140	1.2	75
Bold Black Scraped E. I. & Montan	130–140	.4	99
Bold Black Scraped E. I. & Ozokerite	130–140	0	73
Bold Black Scraped E. I. & Paraffin	130–140	..	62
Pale E. I. Macassar Bold & Beeswax	120–130	.4	62.5
Pale E. I. Macassar Bold & Carnauba	120–130	1.4	75
Pale E. I. Macassar Bold & Japan	120–130	1	65.5
Pale E. I. Macassar Bold & Montan	120–130	.8	83
Pale E. I. Macassar Bold & Ozokerite	120–130	.2	77
Pale E. I. Macassar Bold & Paraffin	150–200	..	55
Pale E. I. Singapore Bold & Beeswax	120–130	1.2	62
Pale E. I. Singapore Bold & Carnauba	120–130	1.8	76
Pale E. I. Singapore Bold & Japan	120–130	.2	80
Pale E. I. Singapore Bold & Montan	120–130	.6	95
Pale E. I. Singapore Bold & Ozokerite	120–130	0	86
Pale E. I. Singapore Bold & Paraffin	150–200	..	64
Elemi & Beeswax.....	98–100	..	56.5
Elemi & Carnauba	100	1	57
Elemi & Japan	98–100	1	45.5
Elemi & Montan	100	1.2	60.5
Elemi & Ozokerite.....	100	1	70
Batu Bold Scraped & Beeswax...	130–140	0	65
Batu Bold Scraped & Carnauba..	150–200	2.2	85
Batu Bold Scraped & Japan.....	150–200	2.6	75
Batu Bold Scraped & Montan....	150–200	2	127
Batu Bold Scraped & Ozokerite..	150–200	2.8	74
Batu Bold Scraped & Paraffin....	150–200	..	69.5
Singapore Damar #2 & Beeswax.	100–110	2.6	60
Singapore Damar #2 & Carnauba	110–120	.8	79.5
Singapore Damar #2 & Japan ...	90–100	0	42
Singapore Damar #2 & Montan..	90–100	0	75
Singapore Damar #2 & Ozokerite	130–140	0	67
Singapore Damar #2 & Paraffin .	140–150	.5	50
Manila WS & Beeswax.....	275–325	18.2	69
Manila WS & Carnauba.....	275–325	16.4	80
Manila Loba C & Beeswax.....	300–325	26.3	68
Manila Loba C & Carnauba.....	300–325	17	79
Congo #4 & Beeswax.....	300–325	18.5	66
Congo #11 & Beeswax.....	300–325	17.6	68
Congo #11 & Carnauba	300–325	21.8	75.5
Kauri Pale #1 & Beeswax.....	300–325	14.3	67
Kauri Pale #1 & Carnauba.....	300–325	10	81.5
Run Brown Kauri #2 & Paraffin.	300–325	..	54

Natural resins dissolve in waxes with varying degrees of ease. The damars (in which class are included Batavia and Singapore Damars, the Black and Pale East Indias and Batu), and also Elemi, a miscellaneous type, are the only ones that dissolve in the waxes without being run or at least partially run. The loss of weight is an indication of the relative ease with which solution takes place. Manila resin—Congo—and Kauri-wax mixtures lose much more weight in the process of combination than do the above damar resins.

A resin difficultly soluble in wax, may be combined by use of a common solvent without marked loss in weight. For instance, Elemi is easily soluble in all the waxes with which it was tested, while Loba C is not. Loba C is easily soluble in Elemi. Elemi may therefore be considered a common solvent for the waxes and the resin and become a medium to effect their combination. Taking carnauba wax as an example, the Manila (Loba C) may be dissolved in the melted Elemi and carnauba added to form a ternary mixture in which both resin and wax are stable.

If it be necessary to have liquid resin-wax mixtures, they may be used for the most part in the form of aqueous emulsions. When the melting point is sufficiently low, they can be readily emulsified by ordinary methods, using commercially available emulsifying agents. Triethanolamine soaps are effective agents. The melting point of the mixture may be such, however, that the addition of water, even at the boiling point, will cause the melted compound to solidify, making dispersion impossible. In the case of Manila resins such a compound may be emulsified by a somewhat different method. The compound is powdered and added slowly to a solution of sodium hydroxide under stirring and heat. Part of the Manila is saponified. The resulting soap acts as the emulsifying agent. Stirring is continued after all the mixture has been added and heat removed, to insure uniform and complete dispersion.

The natural resins dissolve in various commercial waxes with different degrees of ease. The damar and Elemi (one of the miscellaneous class of resins) are the more readily compatible. Difficultly soluble resins may be more easily combined by forming a ternary mixture with Elemi as a common solvent for resin and wax.

Emulsions of resin-wax mixtures are likely to be found in a major portion of their applications. Besides ordinary methods of emulsification, Manila resin-wax mixtures may be dispersed in hot sodium hydroxide solutions.

U. S. Salt Cake Imports

Preliminary import statistics for 1937 show imports of 220,176 short tons of salt cake, a gain of 45 per cent. over the previous year, according to a report issued by the Department of Commerce. The phenomenal increase in receipts was due to the development of increased production of kraft paper in southern states.

Design of Special Chemical Equipment

By G. H. Koven

President, L. O. Koven & Bro., Inc.

JAMES J. SMYTHE, general superintendent of The Blank Chemical Company, needs a new piece of equipment—an autoclave, let us say. Research work and pilot plant have led to the full scale production program which is now put in his lap.

This autoclave is the key unit of the new process. No standard piece of equipment can be used. A new and hitherto never designed unit is essential. Pilot plant operations have laid down certain requirements: An operating pressure of 500 lbs. per square inch; corrosive action of free chlorine in a stated concentration to contend with; need for application of external heat to the process; agitation of a fairly fluid charge required.

James J. is a typical plant executive. As an engineer he can rough out the size and kind of equipment he needs, but he does not pretend to be an expert in mechanical design. He expects his rough sketch to supply the autoclave maker with sufficient data to provide a unit of the proper capacity, meeting his process requirements, and capable of being safely operated at the pressure involved. He does not attempt therefore to specify details of design, even if he has ideas along these lines. If his company were large enough to have a well staffed engineering department which might go into this question of design, James J. is wise enough to expect the outfit that builds his autoclave to contribute plenty to its design.

He could, of course, go to an organization that pretends to no such contribution, but builds what is called for as indicated by the plant executive. But he has had his experience along that line when he was younger and more trusting than he is today. He presents his sketch, about as we see it in Fig. 1, to a firm which specializes in cooperative design of chemical equipment.

Note that the material of construction is not specified. James J. isn't sure himself. He wants advice because his process involves a fairly heavy corrosive action due to free chlorine. He has indicated riveted and welded construction, using lap welds in his main vessel. His gasket arrangement seems to him adequate, but he is open to suggestions. The propeller type agitator should give the mixing action he needs, but he hopes a better way will be suggested if the engineers for the fabricating firm have any ideas along these lines.

So James J. and the engineers of the fabricating firm go into a series of huddles.

The idea of welding is accepted as sound. The next question is one of material construction. A good weldable metal is essential if welding is to be used. Otherwise the pressure involved would point to a far heavier and much more unwielding cast unit.

Among the metals suggested by the fabricator is copper-silicon bronze—which he knows from previous experience will stand up under the chlorine concentrations involved. Recommendations from the maker of the alloy confirm this experience for the particular case in question. It is a highly desirable metal from the welding standpoint, too.

The fabricator proposes to do away with riveting, not only because a stronger welded joint can be obtained by butt-welding, but because a smooth interior surface can be provided. Construction costs will be less, not only because riveting itself is eliminated, but because the cost of countersinking interior rivets will be wiped out. He does not like the gasket design. Instead he proposes a forged ring, containing a tongue and groove joint, which will provide an adequate seal at the high pressure involved in the process. By welding this ring in the shell and the vessel proper, a homogeneous construction is obtainable. No rivets are to be used here, either.

The working drawing from which the autoclave is finally built is shown on Fig. 2. The changes indicated above are shown. Note, too, that in finishing off the joint between the shell of the vessel proper and the forged ring containing the tongue and groove joint, the inside weld finishes off the metal surface right to the inner edge and the forging, instead of leaving a projecting shelf as called for in the rough sketch. Incidentally, Smythe's method of agitation appears to be fully satisfactory.

James J. gets his new autoclave made of a completely suitable metal, in a materially improved design, which cuts his initial costs down by a considerable margin.

He may have wanted a mixing kettle. This time, let us say that corrosive conditions also prevail, but the process specifically calls for stainless steel, not only to resist corrosion but to eliminate contamination of the product. His rough sketch is indicated in Fig. 3. Note that stainless clad steel is called for, with a half jacket for heating with superheated steam.

The result of cooperative design, along the lines discussed above, is shown in Fig. 4. The material to be mixed and processed is a viscous substance which tends

to agglomerate when overheated and which, at the processing temperatures prevailing, can be damaged by localized overheating.

Note that material changes are made in the method of agitation. Not only is a bottom-clearing U-shaped agitation blade used, but two removable baffles are inserted at the sides and the kettle. The top blades of the shaft agitator are retained as in the original sketch. The result is a much more thorough agitation of the mix; prevention of settling out toward the kettle bottom, and a constant breaking up of any lumps formed by the side baffles.

Note, too, that the half-jacket, originally suggested for superheated steam is replaced by a full jacket in order to provide uniform heat distribution and far better temperature control, particularly at the relatively high temperature involved. In this particular case, a substitute heating medium is proposed—electrically heated oil circulation. The reason is the need for close and delicate temperature control, not possible with superheated steam, which was made available within extremely close limits. Incidentally, this cuts construction costs also, because the jacket need no longer be designed for the higher pressure of superheated steam.

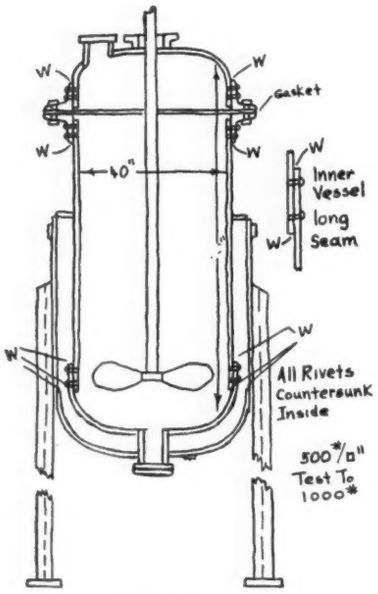


Figure 1

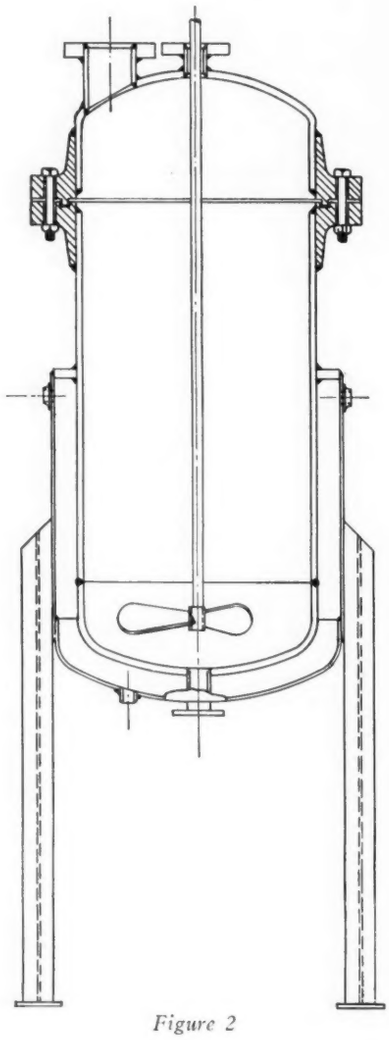


Figure 2

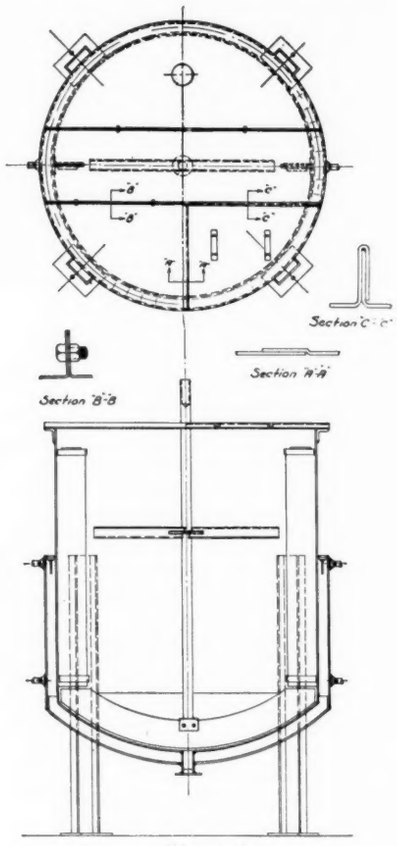


Figure 4

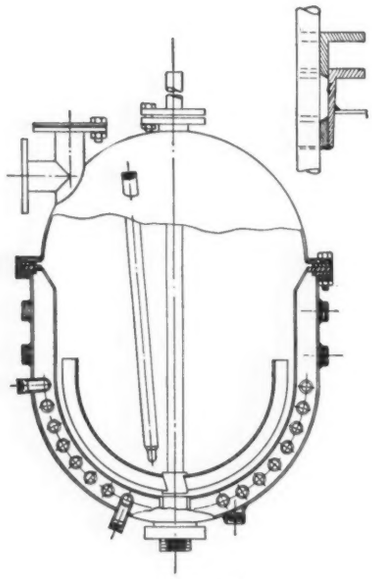


Figure 6

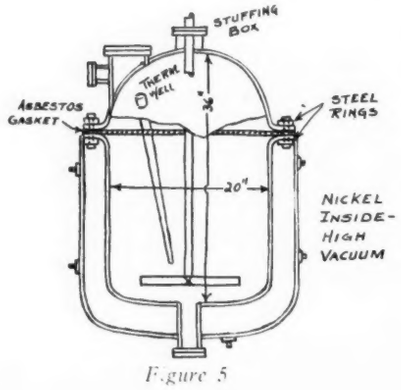


Figure 5

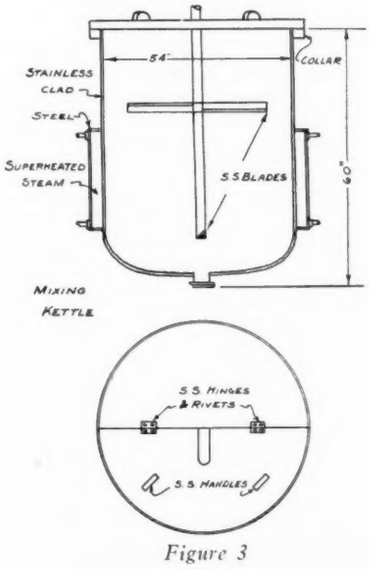


Figure 3

Six diagrams of chemical equipment mentioned in the accompanying article.

but instead has only a slight pressure to withstand. The oil circulating system further recommends itself because the preliminary discussions bring out the fact that the kettle is the first of a series to be installed. Thus, the initial and the higher cost of the oil system will be quickly absorbed by the added kettles to be installed later.

A few minor changes worthy of consideration: The use of angle iron instead of a heavy collar as a sealing at the top of the kettle. The change in the design of the cover, which replaces handling of a heavy half cover, slotted to fit the drive shafts by a small segment easily handled, yet providing for a much tighter cover during operation.

Special Vacuum Kettle

James J. might also be interested in a special vacuum kettle. Fig. 5 shows what his rough sketch might look like, for a vacuum kettle to be used on a synthetic rubber intermediate. Fig. 6 shows the finished working drawing resulting from the kind of cooperative design we are assuming has been utilized.

Here the metal required is nickel—beyond any question, due to process requirements. But note the changes in design which have materially improved the strength, the ease of operation and the performance of the kettle.

The shape of the inner vessel, and consequently of the jacket has been made more greatly curved, the better to withstand the vacuum and to enable the use of a lighter gauge metal. This change in shape also provides for speedier and more satisfactory discharge of the mix. Note the substitution of a U-shaped agitator to keep the mix from settling in dead areas and to make better contact with the idea of the vessel for improved heating and cooling control.

Note, too, the addition of a copper coil in the jacket, to provide for the circulation of a cooling medium which will cool the mass in the kettle at a faster rate and under better control than the original design, which called for the introduction of the cooling medium into the jacket proper. This might cause damage to the equipment and could not provide the delicacy of adjustment the process required.

The gasket joint is improved also. Two gaskets between nickel rings welded to the shell insure maintenance of vacuum not provided for in the rough sketch, where only one gasket was suggested, held between bent-out sections of the vessel proper. The original sketch also placed one each of all gasket bolts *inside* the jacket, making closure and adjustments difficult, while the finished design puts all of the bolts outside the jacket.

James J. is a fictitional character, but a typical plant man. His problems in the design and construction of special equipment do not grow less with the years, are constantly increasing because improved processes are calling more and more for special equipment to meet more and more particularized needs. He can get what he needs—with material improvements on his own original ideas, plus better design, and in almost all cases, materially reduced production costs, if he goes to the right kind of fabricator for his equipment. If he picks an outfit that is merely capable of doing a workmanlike job in the metal called for, all he will get is a workmanlike job in an unimaginative reproduction of his own primary ideas as put before the fabricator. But what he needs, as much as workmanship, is assistance in improving his original ideas.

In other words, let our James J.'s look into the metal working facilities of the plants where they put their special equipment into production. All these facilities are important. But they need much more than actual working facilities. They need broad experience in handling the metals and alloys involved. Even more essential is ability, through long experience in fitting design to specific process needs. Above all, they need creative imagination—on their own part and on that of the fabricator, working in close cooperation to improve the design as to performance service life, and ease of operation and almost inevitably, such cooperative use of imagination will lead to reduced construction costs as well.

Special equipment design is a mutual affair, fully as dependent on the maker as on the user.

Feldspar Industry 1937

The feldspar industry in '37 again broke all previous production records, sales of crude topping the '36 peak by 10 per cent. Sales of ground spar surpassed by 18 per cent. the '36 high, according to U. S. Bureau of Mines. Low-cost western feldspar largely increased its share of the total output. Technical research by the National Feldspar Association on effects of feldspar in glass making, refinements in methods of chemical analysis of feldspar and studies of the application of froth flotation and agglomerate tabling to feldspar recovery reflect the keen competitive situation in the industry.

Crude feldspar: Sales of crude feldspar in '37 totaled 268,532 long tons, valued at $1,383,249, an increase of 10 per cent. in tonnage and 6 per cent. in value over '36. Output in North Carolina, still by far the leading producing State, amounted in '37 to 94,595 long tons, a decrease of about 8 per cent. compared with '36. Substantial advances in production occurred in the other States for which figures are shown separately, except California. Colorado output rose to 42,221 tons, an increase of 64 per cent., while South Dakota ranked third in production, producing 41,392 tons, an increase of 29 per cent. over '36. Production in '37 in other large producing States, with percentages of increase over '36, follow: New Hampshire, 28,831 tons, 9 per cent.; Virginia, 22,175 tons, 8 per cent.; and Maine, 20,191 tons, 23 per cent. Smaller outputs were reported from New York, Connecticut, Arizona, Maryland, and Pennsylvania.

Ground feldspar: Production of ground feldspar in '37 from 31 merchant mills in the U. S. increased to 279,272 short tons, valued at $3,486,741, a gain of 18 per cent. in tonnage and 11 per cent. in value. Of the total spar ground in '37, about 6 per cent., approximately the same ratio as for '36, was of Canadian origin. Tennessee, where much of the North Carolina spar is ground, was the largest producer of ground spar in '37, followed by Colorado and South Dakota, North Carolina dropping from first place in '36 to fourth in '37.

Industry's Bookshelf

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Iron Laws or Bubbles by W. E. Payne, Chapman & Grimes, Boston, 227 pp., $2.50. A plausible, non-conformist view of economics.

Polymerization by R. E. Burk, H. T. Thompson, A. J. Weith and Ira Williams, A.C.S. Monograph series, Reinhold, N. Y., 312 pp. The theory expounded and its practical application explained in the fields of rubber, resins, and petroleum.

How to File and Index by Burcot M. Weeks, Ronald, N. Y., 261 pp., $2.50. Principles of alphabetical, geographical, numeral and subject filing expounded; with chapters on equipment and examples of typical business and institutional filing systems.

Planned Society, symposium by 35 authors, edited by Findlay MacKenzie, Prentice Hall, N. Y., 989 pp., $5. An exhaustive work on the pros and cons, with chief emphasis on the pros.

C.I.O. by J. Raymond Walsh; Norton, N. Y.; 292 pp., $2.50. Putting forward the best foot of the Lewis organization by an ex-Harvard economist.

The Handmaiden of the Sciences by Eric Temple Bell; Williams & Wilkins, Balto., 216 pp., $2. Interesting non-technical explanation of how and why mathematics are used as tools by scientists and engineers.

Money & Trade by Rene Leon; Princeton Univ.; 68 pp., $1.50. A stimulating plea for bimetallism controlled jointly by Great Britain and the United States.

International Raw Commodity Price Control by Robert F. Martin; Nat'l Industrial Conf. Board, N. Y., 166 pp., $3.50. Detailed study of the price changes of nine world-wide commodities interpreted in the effects of all types of artificial price controls during the war and post-war periods.

Semi-Micro Qualitative Analysis by Paul Arthur and Otto M. Smith; McGraw-Hill, N. Y., 198 pp., $2. Text book for the practical introduction of micro analysis for first year students.

Cost Accounting by Charles Reitell, revised by C. E. Johnson; Internat'l Textbook, Scranton, Pa.; 425 pp., $3.50. New edition places more proper emphasis on costs of distribution, with valuable, additional material of particular interest in the chemical field on by-product and joint-product costing.

Collateral Readings in Inorganic Chemistry, edited by L. A. Goldblatt, Appleton-Century, N. Y., 225 pp., $1.35. Magazine articles largely historical in character, the purpose of which is rather obscure.

Laboratory Technique in Organic Chemistry by Avery Adrian Morton, McGraw-Hill, N. Y., 260 pp., $2.50. A new organic manual with more material than usual on the theory of the operations described and set up as practical experiments.

Personnel and Labor Relations by Dale Yoder, Prentice-Hall Co., N. Y., 644 pp., $5.35. A needed description and analysis of the present day labor regulations notably devoid of bias, and well supplied with objective examples of extreme value.

Arc-Welding Handbook by Karl Meller, Hutchinson's Scientific & Tech. Pub., London, 210 pp., 8 shillings, 6 pence. A practical handbook covering welding apparatus materials and technique, scientifically sound, yet of practical use to the welding worker.

The Discovery and Exploitation of the Minnesota Iron Lands by Fremont B. Wirtx, Torch Press, Cedar Rapids, Ia., 247 pp., $2.50. Anyone historically-minded or interested in American natural resources will not want to miss this well documented book.

The History of Commerce by Clive Day, Longmans Green, N. Y. C., 703 pp., $2.50. The best brief summary of commercial history, and soundest interpretation of commercial developments brought up to date since the close of the World War, in a new edition.

Then Came Oil by C. B. Glasscock, Bobbs-Merrill Co., Indianapolis, 350 pp., $3.00. A vividly written story of the Oklahoma oil fields, by the author of some of our best known industrial histories, in the popular vein.

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Field Tests for Minerals by E. H. Davison, Chemical Pub. Co., N. Y. C., 60 pp., $3.00. Clear descriptions of technique, followed by excellent series of photographs, and ending with a table of identifying characteristics of all common minerals.

How to Keep Accounts and Prepare Statements by Earl A. Saliers, Ronald Press, N. Y., 481 pp., $4.00. Not a course in bookkeeping, but a running account of principles of accounting, illustrated profusely with well chosen examples, a book for technical and business men who desire better to understand accounting systems, methods, and results.

The Chemistry of Synthetic Surface Coatings by Wilhelm Krumbhaar, Reinhold Pub. Corp., N. Y., 200 pp., $4.00. From a sound, scientific basis, Dr. Krumbhaar has produced an extremely useful handbook for any man in the coatings industry or selling the coatings industry.

The Technical Analysis of Ores and Metallurgical Products by Franklin G. Hills, Chemical Pub. Co., N. Y. C., 197 pp., $3.00 A useful handbook of commercial analytical methods of chemists at the Experimental Plant, Colorado School of Mines.

The Toxicity of Industrial Organic Solvents by Ethel Browning, British Medical Research Council of London, H. M. Stationery Office, London, 396 pp., 7 shillings, 6 pence. An invaluable, complete summary of toxic solvents, showing properties, uses, toxic action with very complete references.

CREATING INDUSTRIES
1918—1938

A Series of Fifty Articles Reviewing the Progress of American Chemical Industry

Phosphoric Acid

By Dr. J. N. Carothers

Dr. Carothers graduated from Clemson College in 1910, and did graduate work at the University of Missouri in 1911-1912. For the next two years he was employed with Southern Electrochemical Company, Great Falls, S. C., on pilot plant work on Pauling Process Nitrogen Fixation. In 1913 he went with Piedmont Electrochemical Co., Mount Holly, N. C., on phosphate rock smelting for production of phosphoric acid. From 1915 to 1917 he conducted experimental work on electric furnace smelting of phosphate rock for phosphoric acid production for the Bureau of Soils, U. S. Department Agriculture. During 1917 and 1918 he handled various government assignments on war activities, and from 1919 to 1935 was with the Federal Phosphorus Company and Swann Corporation. From the initiation of the pioneer effort in the manufacture of phosphoric acid, he has continued through the war experiments at Anniston, Ala., to the present time when he is connected with the latest finished commercial plant in operation in this country, that of Monsanto Chemical Company at Anniston.

Pulp and Paper

By Allen Abrams

A lifetime devoted to paper research has brought Mr. Abrams to his present affiliation as technical director of the Marathon Paper Mills Company, at Rothschild, Wis. He is widely known for his contributions to the literature of paper manufacture, also for the development of various testing methods and devices in this field. Born in 1889 at Butler, Pa., and educated at Washington and Jefferson College and M. I. T., he received from the former his A.B. in 1910, and his M.S. in 1915; from the latter he received his B.S. in 1915. He began his career as instructor of chemistry at M.I.T. in 1915, where he stayed until 1916. Successively, he has been with Bemis Bro. Bag Co., Mead Pulp and Paper Co., Cornell Wood Products Co., and since 1926 has been connected with Marathon. The A.C.S., American Oil Chemists Society, and the Technical Association of the Pulp and Paper Industry claim his membership. For the latter association he has served as vice president and president. He has two daughters, and when the state laws permit, pursues his hobby of trout fishing.

This Series of Articles will be Continued Each Month

Pulp and Paper

1918—38

By Allen Abrams

PRIOR to 1914 Walker and his colleagues had shown how chemistry joined with engineering creates the new and important field of chemical engineering. Then came the World War and with it the opportunity to demonstrate the applications of science and engineering. That beginning was to establish, after the War, a cooperation among technical, operating and financial interests which was to mean much in new processes and products which were better, cheaper and more abundant than ever before.

That post war period marked also the real start of technical advancement in the pulp and paper industry. In 1915 a small group of interested men formed the Technical Association of the Pulp and Paper Industry (TAPPI)—"for the encouragement of original investigation and research work in mill engineering and the chemistry of paper, cellulose and papermaking fibers generally; to provide means for the interchange of ideas among its members in order that processes of manufacture may be made more efficient and improved along technical lines."

That was a bold move away from the old policy of isolation and secrecy. In the case of most companies, however, there was still a lack of understanding about such matters so that executives were inclined to take up technical work only in a very modest way. Control work must demonstrate its practicability and must pay its own way. That was a reasonable attitude, but sometimes proper opportunity was not provided or else the technical man was not qualified.

This need for men well grounded in technical and operating knowledge was soon so evident that educational institutions began promoting courses which would provide a rounded training. Universities in the states of Maine, Michigan, Idaho, Iowa, New York, and Washington gave instruction in pulp and paper manufacture and research. The Federal Government, in cooperation with the University of Wisconsin, expanded the Forest Products Laboratory until it has now become a world center for information on wood and the related products, pulp and paper. In 1930 Mahler gathered together a group of progressive manufacturers who established the Institute of Paper Chemistry in Wisconsin. This school selects a group of graduates from other colleges and universities and trains them during the winter in the technical details of the manufacture of pulp and paper. During the summer they are placed in mills to secure first-hand experience in operation and control. At graduation these men go into responsible positions as technical men, superintendents, and managers of operating companies.

Today about $100,000,000 is spent annually for research in all industries of this country. Yet not over 10 per cent. of the pulp and paper industry can be said to engage seriously in this subject. Most fundamental studies in this field are being carried on in public or semi-public laboratories, and it is fortunate that American industry is finally becoming conscious of the importance of so-called pure research.

Whereas colloid chemistry was almost unknown at the beginning of the century, it now assumes considerable importance. Cellulose and lignin, two of the main substances in wood, are essentially of colloidal character, though the X-ray shows that cellulose has some crystalline structure. The complete chemical constitution of cellulose has not yet been established, yet it is one of the important raw materials for chemical manufacturers.

Other than cellulose, lignin is the most important constituent of wood, and yet very little use is being made of it today. Partly this is due to the fact that only recently has sufficient information been accumulated on its chemical structure and reactions. Another reason is that there has not been available any large quantity of even relatively pure material. However, recent research has led to a method for precipitating a lignin product from waste sulfite liquor, thereby opening up a potential quantity of two million tons of lignin per year. Thus far the material has yielded a number of interesting products which are being produced in commercial quantities. Many other chemicals can be developed from this base and it may rival coal tar as a builder of new industries.

The extensive research work on purified cellulose and lignin illustrates the long and tedious course usually necessary in carrying an idea through to the final result. Equally well it shows that the successful exploitation of a material requires a complete knowledge of

its properties before there can be full development of its uses. In fact, this knowledge is of such importance that the American Society for Testing Materials devotes itself entirely to a study of adequate testing methods and specifications for materials. In the pulp and paper field TAPPI and other organizations have made progress in standardizing instruments, methods and specifications.

Some of the testing methods which have done much to improve our knowledge of how to make better pulp and paper products at lower cost are: the microchemical methods for studying the effect of reagents on wood structure; alkali solubility for determining amounts of alpha, beta, and gamma cellulose; cuprammonium tests for degree of aggregation in the cellulose micellae, and the copper number for determining cellulose degradation; strength testing of pulp; screen classification of pulp; determination of hydrogen ion concentration; new and more exact information on such physical properties of paper as its mechanical strength, water- and moistureproofness, and optical characteristics.

The development of new materials, methods, and products often requires heavy expenditures for research with little advance knowledge as to which particular projects may be profitable. Statistics prove, however, that properly organized research will show an average return of from five to ten times its cost. Our patent system furnishes incentive for the creation of new processes and products, even though it needs to be strengthened and to have certain abuses eliminated. We need more patent attorneys who have a thorough knowledge of technical subjects and a grasp of business methods.

Research has become firmly established in modern industry and it will be far more important in the future. The courage and vision of executives, the searching studies of technical men, and the cooperation of manufacturers will produce results beyond even the most fantastic dreams of today.

Raw Materials

The United States is fortunate in having within her borders all of the essential materials for the production of pulp and paper. Wood is the most important of these, constituting about 90 per cent. of the total material used by the industry. In this country about 8,000,000 cords are cooked or ground into pulp each year. It is little wonder that the forester should be looked upon as a propagator of cellulose and that so much study should be given to the conservation of our forests. Even though the pulp and paper industry consumes less than 5 per cent. of the annual cut of wood and despite the fact that North America has 40 per cent. of the world supply of softwood, yet there is a growing appreciation of the need to extend this supply.

A study of waste brings out the fact that nearly 10 per cent. of the pulp wood cut has been lost through decay; but now a considerable portion of this can be cooked into usable pulp as the ordinary decay injures the cellulose relatively little. In many localities slabs, edgings, and other saw mill waste are no longer burned, but are supplied to nearby pulp mills. Some companies in the South even take up the stumps, extract the wood rosin for manufacture into paper sizing, and employ the extracted wood for making certain grades of pulp.

The loss occasioned by mold and fungi on stored groundwood pulp has been almost entirely eliminated by proper chemical treatment. Pulp and paper mills have focused attention on fiber wastes to find that stream pollution can be reduced at a profit. There has also been an enormous increase in the repulping of waste papers and their reuse in certain grades of paper.

The Wood Supply

The supply of pulp wood is being augmented in other ways. Some mills are reforesting at a rate to assure a perpetual cut of timber, installing the necessary safeguards against fire and insects. There has been extensive study on the rate of wood growth in various parts of the country to find where it may be produced cheapest. Thus, while the pulp industry was originally concentrated in the New England states, and then in the Middle West, the past twenty years have brought a shift to the Northwest, and lately to the South. Both of the last two sections have large stands of timber and climatic conditions favor rapid growth.

Another interesting attack on the problem has come about through the crossing of species to produce hybrids which will give a maximum rate of cellulose production. A number of patents on these trees have already been taken out and one large company is carrying on extensive experimentation with this idea.

Much has been learned about the fiber characteristics and cooking of different woods so that those which are plentiful may be substituted for the scarcer kinds. Spruce, the most valuable of all pulp woods, has been replaced to some extent by other species, and even rayon pulp can be made from western hemlock and southern pine. Broadleaf woods and semi-pitchy species, such as jack-pine, can now be cooked by a modification of the sulfite process. Herty's work has shown that certain southern pines do not develop appreciable resin content until heartwood begins to form and that a suitable yield of pulp wood is obtainable before excessive pitch is formed. This may expand the sulfite industry in the South where sulfate production is now firmly established.

Semi-chemical pulping, a combination of mild cooking and mechanical attrition, has been employed successfully on chestnut and other woods. A good yield is obtained and while the pulp is of coarser quality, it is suitable for the manufacture of certain papers and boards. Improvements have been made in the operation of the regular groundwood, sulfite, sulfate and

soda processes, which increase the yield of pulp and produce a higher quality. Since the sulfate process can be applied to more species of wood than any other, improved bleaching is yielding white pulp which can go into the finer grades of paper.

The gloomy prophecies of wood scarcity made twenty years ago, have not been fulfilled. Rossed spruce wood then sold for $25 per cord and today it may be bought for from $15 to $20 per cord. This does not mean that we can be reckless, yet no future concern need be felt if fire and insects are kept down and if proper conservation is employed. Foreign countries are permitted to ship pulp into this country duty free, which saves our own forests. We now import, in the form of pulpwood, wood pulp, and paper, the equivalent of more than one-half of the pulp wood which we consume.

There has been a constant search for fibrous raw materials to supplement or replace wood, but no serious competition has developed and wood continues to supply 85 per cent. of our material for pulp. No other growth has been found which approaches the tree as a commercial producer of cellulose. Whereas the cotton plant yields about 16 pounds of fiber per acre per year, southern slash pine has an increment of 1,000 pounds woody growth per year and western hemlock yields as much as 2,100 pounds. In the case of the latter two, less than half the amount shown is available as commercial cellulose. Straw holds an important place among the non-woody plants. The cornstalk has again and again received extensive exploitation, but without success, due partly to the cost of securing satisfactory raw material and partly to inability to obtain a uniform, usable pulp. The greatly expanded demand for coarse pulp for insulating boards has resulted in the use of other fibrous materials such as sugar cane bagasse and licorice root. These, and other annuals, offer possibilities for recovering waste and making cheap pulp so that they will receive increasing attention.

Chemical Consumption

Aside from fibrous materials the pulp and paper industry consumes annually about 100,000 tons of alum, 250,000 tons of sulfur, 350,000 tons of lime; and large quantities of rosin, chlorine, salt cake, soda ash and caustic soda, casein, starch, clay, talc, and other fillers. Twenty years ago many of these materials were sold with little attention to specifications, but the condition is quite different today. The public has become more discriminating and more exacting, setting up such requirements that manufacturers need uniform, high quality materials. Thus, the demand for whiteness and opacity led to the development of a new high-white pigment, titanium dioxide, which in turn makes the clay supplier improve the color of his material. The introduction of wood rosin, made by solvent extraction of chips from pine stumps, has put pressure on producers to bring out a cleaner and more uniform gum rosin.

Another tendency in papermaking is to introduce materials at a point as near the end of the manufacturing process as is feasible. This usually results in lower costs due to less waste and less conversion. Suspended and dissolved solids such as pigments and dyes are applied on the wire, at the beginning of the driers, at the tub, or even on the calenders. Substances which do not wet readily with water are applied in the form of emulsions. Rosin size, the original emulsion for waterproofing paper, is now shipped in dry form as well as in a thick liquid. Some mills produce rosin size by circulation of caustic soda solution over lumps of rosin. The waterproofing of paper is also accomplished by emulsions of wax, synthetic resins and even asphalt. Rubber latex is employed in the manufacture of some papers and boards where toughness, pliability and waterproofness are required.

Manufacturing

The production of pulp and paper has been influenced markedly during the past twenty years by pure and applied science. A breakdown of chemical engineering into unit processes has led to an enormous amount of study on the flow of heat and fluids, the subdivision and separation of materials, drying and distillation. Information obtained in these studies has been of direct benefit to this industry for it fosters rational design of equipment and better operation of processes.

Pulp and paper manufacturers have gone in for more equipment and they want bigger, better and faster machines. In 1920 the largest paper machine was 200 inches wide, capable of traveling 750 feet per minute; today there are machines 300 inches wide traveling over 1,300 feet per minute—an increase in capacity of 150 per cent. In some measure this acceleration is typical of the change that has gone through the industry. A heavier burden was thus placed on the production man, for he has more elaborate machinery to tend and operate. This made it necessary to develop control instruments and equipment to remedy this situation. We can now measure, record and regulate such diverse factors as the flow of liquids, gases and solids, the speed of machines, the hydrogen ion concentration of liquors, the temperature and humidity of air.

There have been noteworthy advances in the cooking of pulp. Chips going to the digester and the pulp coming out are accurately weighed, so that yields can be calculated for different woods and processes of cooking. Production of pulp in a continous type of digester has been tried and may lead to a commercial process. The Mason method of pulping explodes chips from waste wood out of a heavy gun operating under a steam pressure of 1,200 pounds. The pulp is formed into a thick sheet and the simultaneous application of heat and pressure produces a dense, hard, waterproof

board. Alkaline cooking methods employ vacuum evaporation. The lime sludge, formerly a waste product, is now reburned. In the soda process destructive distillation of the concentrated waste liquor yields such materials as methanol and acetone. In the sulfate process a profitable yield of turpentine and other materials may be obtained as a by-product.

The sulfite industry has long suffered from irregularity in cooking conditions due to lack of effective circulation. No metal was available which would stand up suitably against the chemical and physical strains imposed by the external circulation of the hot cooking liquor. Within the last decade alloys of iron, chromium, nickel, manganese, and molybdenum, have been fabricated into the necessary parts and efficient circulating systems are in operation. The same alloys serve well for blowpit bottoms where they have much longer life than the wooden bottom and also reduce the loss of pulp. These metals stand up for digester fittings and have been used even for welded digesters. Such results have stimulated successful research on materials for pipes and equipment handling such liquids as chlorine, bleach liquor and alum solutions. Many new metals and other materials have thus been made available to help in the solution of these problems.

Formerly much of the heat and chemicals were lost during the relief of pressure in sulfite digesters. Now a method has been worked out whereby the relief gases are blown into fresh cooking acid, building up the chemical content and preheating the acid to shorten the cooking time.

Waste Sulfite Research

So much attention has been focused on waste sufite liquor that hundreds of patents have been granted and many recovery processes tried out. The liquor is not only a nuisance, but it also contains valuable chemicals and more than half of the wood supplied to the digester. Most previous methods attempted to evaporate the liquor as a whole and thereby secured a mixture of organic and inorganic materials. The process was not practical because the metal corroded, evaporation tubes plugged, and the sludge was either hard to burn or found but limited use for other purposes. Meanwhile, over a ten year period the Howard fractional precipitation process has been developed and put into operation. In the first stage, lime is added to throw out calcium sulfite which is returned to the fresh liquor system for conversion into calcium bisulfite. In the second stage, a further addition of lime throws down the colloidal organic lignin precipitate which is then passed to an Oliver filter. The filter cake is pressed further and utilized either for fuel or as a starting material for the production of such diverse chemical products as tanning and dispersing agents, vanillin, and thermo-setting resins. Moreover, the process reduces the oxygen demand of the waste liquor by about 70 per cent.

In the field of pulp bleaching there has been such a remarkable change as to affect the whole complexion of the pulp and paper industry. After the World War the use of bleaching powder was largely discontinued. Instead, liquefied chlorine was shipped in tank cars direct to the pulp mills where it was combined with lime and water to produce bleach solution. At that time one stage of bleaching was considered sufficient and pulp densities of four or five per cent. were generally employed in the operation. Later installations were made allowing the liquid chlorine to gasify and then be introduced direct to the pulp. Rubber and lacquer coverings for equipment used in the direct chlorination stage prevent attack on metal or concrete surfaces. The pulp was neutralized with lime, washed and subjected to a calcium hypochlorite bleach. The improvements in pulp quality and costs were so pronounced that the system was adopted quickly by the sulfite industry.

The Kraft Pulp Development

Meanwhile, considerable attention was devoted to the bleaching of kraft pulp, used largely for the coarser grades of paper where color was of little importance. Semi-bleaching had been practiced in some mills, but attempts to produce full bleached pulp resulted in high costs, doubtful color, and poor strength. The use of two or more stages in sulfite bleaching encouraged research work on kraft which has finally led to the production of strong, high white pulp at a reasonable cost despite the use of as many as five stages of chemical treatment. Today the whole industry is watching this development, and if it continues to succeed, kraft pulp will assume greatly increased importance.

These improvements in pulp quality, brought about by better cooking and bleaching, have been supplemented by drying under milder conditions. At the ordinary drying temperatures of 200 to 240° F., cellulose undergoes an irreversible change in colloidal condition, accompanied by a case hardening which results in lowered pulp strength. Minton has perfected equipment so that pulp can now be dried under a vacuum of 27-28 inches and at a temperature as low as 100° to 110° F. This has led to rather widespread acceptance of vacuum drying for pulp and for some types of paper.

All of these improvements have made the pulps of today much stronger and of better color. Dirt is now largely eliminated. Bark and knots are removed with care, but the final cleaning is carried on by centrifuging the pulp suspension and by gravity systems. Pipes contaminated with deposits of slime, rust, and mineral matter are cleaned successfully by treatment with a mixture of muriatic acid and an inhibitor. These inhibitors are usually nitrogenous organic materials of high molecular weight, acting as negative catalysts, stopping the action of the acid on iron, but not affecting its attack on the deposits in the pipe.

FROM FOREST TO PRESS ROOM—

The journey made by the tiny wood fibres that bring the world's news to your breakfast table—in words and pictures—is a long and complex one. Chemical processes play vital roles at many of the stages between the felling of timber and the final magic whereby printers' ink brings to life the vibrant force we know as the Newspaper.

Sulphur, which is constantly being given new duties as modern industrial processes find new short-cuts to production and evolve new products, has long played an important role in the manufacture of pulp and paper.

The making of sulphite pulp requires more than 200 pounds of sulphur per ton of finished product, accounting in part for the fact that 18 per cent of the annual United States consumption of sulphur is used by the pulp and paper industry. It has been a source of great satisfaction to Freeport Sulphur Company that we have been able to serve this progressive and vitally important industry for more than 25 years.

From "salt domes" 900 to 1,500 feet below the surface of the coastal plain of Texas and Louisiana, comes the world's finest elemental sulphur—better than 99.5 per cent pure and free of arsenic, selenium and tellurium. Ample stocks and up-to-date shipping facilities at our properties at Port Sulphur, Louisiana, and Freeport, Texas, assure prompt and dependable shipments.

FREEPORT SULPHUR COMPANY

122 East 42nd Street **New York City**

After cleaning the pipes, any further formation of slime is prevented by treating the water with a small amount of chlorine or chloramine. This keeps the water sterile so that algae growths do not build up to make a coating inside the pipe. Since the chloramine treatment retains sterility for a longer period than chlorine, it can be used in white water systems to suppress slime and thereby permit recirculation of the white water. Mills are thus enabled to recapture pulp and other materials such as rosin size, alum, and fillers.

Another subject which has received much attention lately is the testing and control of hydrogen ion concentration. The maximum operation of many processes requires a suitable hydrogen or hydroxyl ion value, knowledge of which has cleared up some otherwise difficult problems. For example, the practice of using an excess of alum in setting rosin size leads to a low pH or hydrogen ion concentration, which in turn may cause serious brittling of the paper. Other fields where pH control is required are in the manufacture of cooking liquors, in bleaching, and in coating. Proper pH will help to keep down foaming and even to prevent the sticking of paper to press rolls. Thus, the technical man again furnishes more eyes to the operating man, a further proof of a steadily strengthening bond between science and industry.

Uses of Pulp and Paper

The annual sales of pulp and paper products are now well over the billion dollar mark. In 1880 a consumption of 20 lbs. of paper per capita in the United States grew to 120 pounds in 1917 and to 220 pounds in 1937. No other country approaches our own in this respect. The industry has been confronted nevertheless with an overcapacity which makes competition keen and which gives an urge to expand the uses of present grades. Accordingly, many new products have either been initiated during the past twenty years or else their commercial use has been started. These include molded pulp products, wallboard, cellulose wadding, fiberboard shipping cases, and many others.

No part of the industry has had greater ingenuity applied to it in the past twenty years than has increased consumption; and in this field probably the development of packaging has yielded the most fruitful results. Consider first that the main purpose of packaging is to preserve goods in their original condition from producer to consumer. There are many corollaries to this, such as a neat, attractive appearance; which will meet all handling conditions; which will identify the product and the manufacturer; which will lend itself to modern packaging equipment and methods. The technical requirements of the packaging material and of the finished package may be simple or complex. Variously the package must resist one or more of the following: light, heat, moisture; oxygen or other gases; grease, water, oil and other liquids; insects, mold and bacteria. The package may be delivered ready for use as in the case of fiberboard cans for ice cream and other dairy products. It may be furnished in knock-down form as in the case of bags and most cartons. Finally, it may be made up at the packaging point either from sheets or rolls, as in the case of wrapping bread or forming a bag in a cereal carton.

Take the case of the food industry because of its tremendous size, relative stability, exacting sanitary and quality requirements. Even twenty years ago it will be recalled that baking goods, candy, dried fruits, and many other food products were sold without packaging. Waxed paper, then relatively new, was adapted to these foodstuffs to protect them against handling and loss of quality. Many other wrappers have been introduced since then. Today so few articles are sold in bulk that the food merchant has become a purveyor of packaged goods.

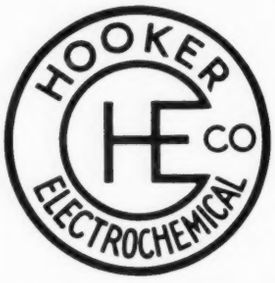
Paper-board vs. Wood

In the dairy field, butter was once dispensed from a wooden tub, but the moistureproof fiber carton put machine designers to work and changed this method of merchandising. The process cheese manufacturer started many years ago to employ the unit package, but it is only lately that natural cheese has been put up in packages which would resist mold and moisture loss. Cottage cheese and dried milk are sold in fiber containers and the metal ice cream can is being replaced by fiber cans. Stricter sanitary requirements are bringing the paper milk bottle forward and are putting a complete fiber cap over many of the glass milk bottles.

Most of these problems require an intimate knowledge of the wares to be packaged. Certain foods will become rancid under the action of light and oxygen. This effect may often be inhibited by the use of opaque sheet materials or by employing an inert gas such as carbon dioxide. When transparent wrappers are employed certain colors, especially in the yellow part of the spectrum, will prevent the passage of waves up to 4,900 Ängstrom units, which rays are responsible for development of rancidity. The advent of frozen foods raised the question of retaining moisture at low temperatures, while the sterilization and hot packaging of dried fruits introduced new problems of sealing and maintaining sterility.

The attention given to sanitation in the food business has created a public consciousness which has its effect in other ways on the paper industry. The public towel and drinking cup have long since been eliminated. Paper napkins, tablecloths, plates, cups and even eating utensils are employed in vast quantities because of their cleanliness and ease of disposal. Hospitals and homes use numerous kinds of disposable paper products.

The introduction of Cellophane into the United States created a new philosophy in the merchandising of many products—the ability to see the article and at



CAUSTIC SODA AND LIQUID CHLORINE

PLUS HOOKER SERVICE

Many paper mills, large and small, have for years relied on Hooker for their supplies of Caustic Soda and Liquid Chlorine, largely because

•

Hooker maintains ample stocks of high quality for prompt shipment.

•

Hooker retains paper specialists of note for technical field service to customers.

•

Hooker operates a research laboratory to promote ever rising quality standards for products and efficiency in their use.

HOOKER ELECTROCHEMICAL COMPANY

Eastern Sales Offices: Lincoln Bldg., New York City, Works, Niagara Falls, N. Y.
Western Sales Offices: Tacoma, Wash. Works, Tacoma, Wash.

OTHER HOOKER CHEMICALS

LIQUID CHLORINE · BLEACHING POWDER · MURIATIC ACID AND SOLVENTS
INSECTICIDES · DYE, PHARMACEUTICAL AND PERFUME INTERMEDIATES.

8802

the same time to have it protected from contamination. Here was a sheeting which in 1924 was of none too good quality and which sold at the unheard of price of $2.65 per pound. At first its use was limited to the packaging of a few expensive products. Then strength and flexibility were markedly improved and moistureproofness and heat sealing qualities were imparted. Sales so increased that in 1936 the price of plain Cellophane had dropped to 35c and the moistureproof type to 45c per pound. This extended use of Cellophane and its sister product, rayon, has had an important effect on the production of high quality pulp of which they consume about 200,000 tons annually in the United States alone.

The trend toward transparency has resulted in the development of other transparent wrappers from cellulose acetate, rubber hydrochloride and even casein. The tendency has also reacted favorably on the lower priced semi-transparent sheets such as glassine. It has stimulated the development of clearer, better quality waxed papers. It has made the manufacturer more particular with the quality and appearance of the article he is packaging. Paradoxically, the movement toward transparency has also induced a swing to the other extreme of opacity. For example, much bread is wrapped today in a fully opaque sheet instead of the transparent waxed paper formerly employed.

The application of lacquer to Cellophane for imparting moistureproofness and heat sealing has promoted its use on papers, particularly those of a dense structure, but even on some of the more porous grades. By using the proper lacquer certain qualities may be imparted to the sheet, such as transparency, greaseproofness, heat sealing, moistureproofness and waterproofness. The coating of boards for cartons imparts resistance to scuffing and improves the appearance materially. This is true also of cover paper for magazines and booklets. Most of these lacquers are produced from a nitrocellulose base, but sometimes resins are used.

Molding or thermosetting resins have also been employed for impregnating paper. A number of layers are then laid together and welded under heat and pressure into dense, hard panels. With the constant advance toward lower priced resins, such combinations of fiber and resin should continue to replace lumber, metal and other building materials. The soft type of wall board made from various woody growths has long been used for thermal insulation on buildings and is now being adapted for acoustic purposes also.

Keen competition has grown up between industries. Pulp and paper products have made their share of replacements as, notably, when fiber shipping containers supplanted wooden boxes; paper tissues replaced cloth for napkins, tablecloths and handkerchiefs; fiber containers for glass jars, bottles and metal cans for foods and other products.

It is a shifting scene in which many of the hopes and aspirations of today become the realities of tomorrow. So, while the role of prophet is more dangerous than that of historian, one can predict confidently that the pulp and paper industry has developments ahead which will overshadow those of the present. These will bring greater comforts through better and cheaper goods which will make their contribution to the more abundant life.

Vitreous Enamel Frits

Vitreous or porcelain enamel is a true glass fusible to metal. Usually from 80 to 85 per cent. of an enamel glass is composed of the elements sodium, potassium, aluminum, boron, oxygen and silicon, which may be considered the basic glass-forming elements. Additional less familiar elements are desirable and necessary for the control of specific properties.

Since porcelain enamel glass is a volume product and is sold as an intermediate raw material for other manufacturing processes, its selling price is relatively low and only such materials as are economically available in reasonably large quantities can be used. Many of the elements may have exceptionally desirable properties, but are prohibitive for use because of cost, lack of availability in large quantities, or both.

Lithium is used to some extent for its fluxing properties and its high coefficient of expansion. The most commercial form is lepidolite, which is expensive considering its relatively low lithium content and the similarity of its properties with the familiar element sodium, available in many forms.

Barium is commonly used as a flux and in small amounts helps to impart a gloss to the fired enamel surface. Its density lends sparkle or life to the glass. It is also valuable because of its relatively high coefficient of expansion. The common form used in enameling is precipitated carbonate or ground witherite.

Beryllium is available to the industry in the common ore beryl, but the cost is prohibitive for any advantages to be gained since its properties are quite similar to those of calcium, which is obtained in the common form of lime.

Titanium is exceedingly valuable because of its similarity to silicon, and its greater fusibility in the presence of silicon. Acid-resisting enamels can easily be made if sufficient silicon is used, but it is too refractory when high acid-resistance is desired. Titanium can be substituted for silicon for the development of acid-resisting properties at normal fusing temperatures. Titanium is added in the form of refined oxide. In excess of three to four per cent. it imparts a yellow or muddy cast to the enamel. Its excessive cost compared to that of silica, as well as the color effect, makes it desirable to keep the percentage as low as possible, consistent with the degree of acid-resistance and fusibility desired.

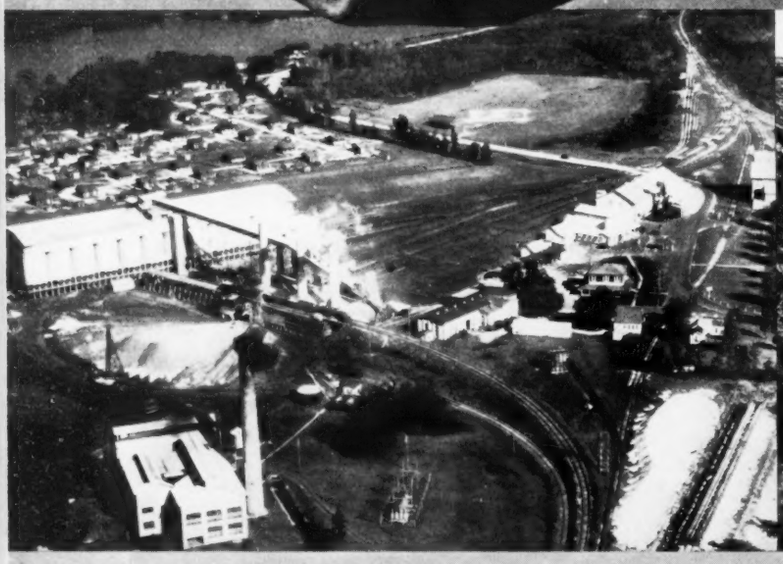
Zirconium is of no value in aiding acid-resistance, but when properly balanced with other materials, aids in developing opacity. This is true of many of the elements in Groups IV and V of the periodic system. Cerium, tin, phosphorus, arsenic, antimony and molybdenum are all valuable as opacifiers. Of these, antimony is most commonly used.

Fluorine is used in amounts up to seven or eight per cent., and is exceedingly valuable because of its properties to opacify by gas formation. It also helps to whiten the glass by volatilizing iron, a strong coloring agent, as ferric fluoride. Fluorine aids in the smelting process because of the active fluxing properties of the compounds which contain it.

Cobalt, the only less familiar element of any importance in Group VIII, is essential in the base coat enamels because of its property of rendering the enamel fusible to iron. It also is a strong colorant for dark glasses. Abstracted from a paper delivered by Glenn H. McIntyre, director research, Ferro Enamel Corp., to a recent meeting of the A.C.S. in Cleveland.

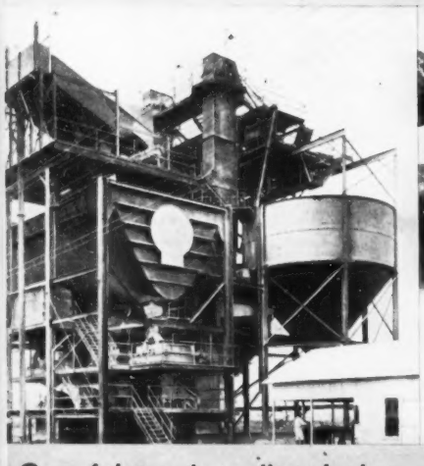
PURE ELEMENTAL PHOSPHORUS

The American Agricultural Chemical Company pioneered in the electric furnace method of producing elemental phosphorus from phosphate rock, making available to consuming industries phosphoric acid of the highest standard — guaranteed 99.99% pure. This acid, meeting all specifications for Reagent, USP Syrupy and Pure Food grades serves as the basis for a complete line of pure food and technical grades of calcium and sodium phosphates.



Airplane view shows part of Pierce, Florida — thriving little "phosphate-mining city" entirely owned and operated by The American Agricultural Chemical Company.

Close-up view of hydraulic mining of phosphate pebble rock in one of the pits of The American Agricultural Chemical Company mining properties in Florida.



One of the modern, all-steel, electric washers, first step in refining "AA QUALITY" phosphate pebble rock.

Florida pebble phosphate rock just as it comes from the washer. Extensive rock deposits form the basis for wide range of "AA QUALITY" chemical products.

View of electric furnace, developed by AAC engineers, used in converting phosphate rock into pure elemental phosphorus.

The AMERICAN AGRICULTURAL CHEMICAL Co.

50 CHURCH STREET, NEW YORK CITY

Phosphoric Acid

1918—38

By J. N. Carothers

THE last two decades have been accelerating progressive years in the age-old story of phosphorus. Changes in processes, improved quality, and lowering of prices have marked this period as historic. New and expanded uses for phosphoric acid and phosphates in different industries have also contributed to this interesting development with its attending demand for increased quantities. Increased consumption may be attributed largely to greater purity of phosphorus products and lowered market prices. These permitted uses prohibited formerly by one or both of these considerations.

Except for a limited quantity produced from elemental phosphorus, all phosphoric acid and phosphates entering food and chemical markets in 1918 were produced by the so-called wet process. Generally this process consisted of treating either bone or phosphate rock with sulfuric acid and then filtering off the resultant phosphoric acid. This acid was then concentrated and treated for the removal of such impurities as it was necessary to eliminate depending upon the use for which it was intended.

The phosphate rock used in the wet process is the same as used for fertilizer production. The phosphoric acid, therefore, contained impurities which represented nearly all the components of the phosphate ore, such as lead, arsenic, fluorine, and sulfates. Removal of these impurities necessitated tedious and expensive steps in purification. The phosphates also had their purification problems since their principal outlets were in the food and chemical fields. Mono-calcium phosphate is a leavening agent in self-raising flour and baking powder; di-sodium phosphate, used in the weighting of silk; sodium acid pyro-phosphate, also a leavening agent in baking; and tri-sodium phosphate, used as a detergent, water softening agent and cleanser.

Just prior to 1918 process improvements in the manufacture of phosphoric acid definitely got under way. A review of the patent literature clearly shows this trend in development. It was in 1914 that work was started by Hechenbleikner, who began smelting phosphate rock in an electric furnace to produce phosphoric acid. The furnace was designed for 5,000 K.W. power input, and actually operated at 4,000 K.W. This work was undertaken in the interest of the Southern Power Company near Charlotte, N. C. A fairly extensive patent literature covers this activity, and insofar as is known, the electric furnace of Hechenbleikner was the largest used up to that time in smelting of rock, either for phosphorus or phosphoric acid.

In smelting phosphate rock, whether by means of the electric or blast furnace, the reaction is one of reduction and slagging. The charge is composed of the phosphate rock, coke, and silica, represented by the following equation:

$$Ca_3P_2O_8 + 5C + 3SiO_2 = Ca_3SiO_5 + P_2 + 5CO$$

The reaction requires for satisfactory operation a temperature of 1300°-1500° C. At this temperature the carbon of the coke reduces the phosphorus pentoxide in the ore to elemental phosphorus, and the lime combines with the silica present to form a slag. If it were practical to remove the lime without slagging it, the process could be carried out commercially without the addition of silica to the charge.

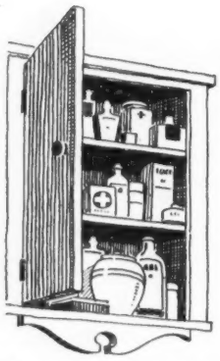
As so often the case in pioneering processes, Hechenbleikner met with great difficulties in obtaining satisfactory materials of construction throughout the process. The development of corrosion-resistant materials and alloys was then in its infancy, and, like most infants, gave trouble in handling. In this operation the phosphorus vapor and carbon monoxide passed from the furnace into a combustion chamber where air was admitted, and burning took place according to the following equations:

$$2P_2 + 5O_2 = 2P_2O_5$$
$$2CO + O_2 = 2CO_2$$

The phosphorus pentoxide thus produced combined with water to form phosphoric acid. The gases passed from the combustion chamber into a series of towers packed with baffling material over which phosphoric acid was circulated. The strength obtained in this way seldom exceeded 60 per cent. H_3PO_4.

After eight or ten years of work this undertaking was abandoned, largely because the interest of the Southern Power Company in using this process as an outlet for power had disappeared. Power demands for other purposes, not the technical difficulties, caused the abandonment.

Phosphates in every woman's life



Phosphates are in many of the cleansers and drugs.

MRS. EVERY WOMAN has given us permission to go thru her house — to find out how phosphate affects her daily life. It is impossible to enumerate all the products in which this beneficent (doer of good) acid and its compounds bob up. Let's start at the bath.

The porcelain tub, wash-basin and tile floor gleam spotlessly, the towels on the rack are snowy white. The bath salts are water-softening, and the soap cleans thoroly—rinses easily.

In the medicine chest are tonics and laxatives. There is stabilized peroxide, and tooth paste and powder that whiten without harming enamel. In the making of the medicinal, toilet and household articles, phosphates have played a part.

Phosphoric Acid has gone into jams, jellies, beverages and waxes.

In the kitchen, we find glasses that are crystal clear —dishes are dazzling white —silverware gleams. There are washing compounds and soap, praise be, that Mrs. Every Woman can use without giving her hands that dish-pan look, thanks to this good fairy of the acids.

Thanks to phosphates, dish-washing and wiping are easier.

In the pantry stand row on row of tart jams and jellies, bread, gelatine, self-rising and pancake flours, all indebted to "phosphates." The milk, too, is richer in vitamins, because the ensilage fed the cows was treated with phosphoric acid. It has gone into the cans of floor waxes, shoe polish, and candles.

Out in the garden, Mrs. Every Woman is puttering around borders that are freely flowering. In the background, the vegetable garden is green with profusely bearing plants.

So, inside the house and outside— upstairs and down—in the things people eat and drink and wear and bathe, wash and launder with, "phosphorus mirabilis" plays its helpful part.

Phosphoric is well called "The Beneficent Acid." This company is one that makes all types. Recent developments have made it economical and many industries are solving production problems with it. Let us consult with you on its possibilities.

Phosphoric — "The Beneficent Acid"

Phosphoric Acid Compounds make flowers and vegetables flourish.

VIRGINIA-CAROLINA CHEMICAL CORPORATION
PHOSPHATE PRODUCTS DIVISION
Richmond, Virginia

VC CHEMICALS

Phosphoric Acid, in Drug, Food, Technical and Commercial Grades. Calcium and Sodium Phosphates and Special Phosphate Compounds. (Also distributors of heavy chemicals in the South Atlantic area.)

Prior to Hechenbleikner's work with electric furnace phosphoric acid, small electro-furnaces were producing limited quantities of elemental phosphorus. Probably most of their output went into the manufacture of matches, for the food and chemical industries were at that time utilizing limited amounts of phosphoric acid made from the burning of elemental phosphorus. What limited demand in a field subsequently so large, was the then prohibitive prices of both phosphorus or phosphoric acid.

About 1915 the Bureau of Soils, U. S. Department of Agriculture, became interested, through Dr. Frank K. Cameron, in the possibilities of the electric furnace for smelting phosphate rock as a means of producing phosphoric acid for concentrated fertilizers. This marked the beginning of a countrywide interest in such fertilizers, and from this date their use has greatly increased. The work of the Bureau of Soils in electric furnace smelting of phosphate rock and production of phosphoric acid extended over a period of two or three years; and during this time the Cottrell precipitator was first applied in the collection of phosphoric acid from smelting operations.

Although the Bureau of Soils was primarily interested in phosphoric acid for fertilizer, commercial producers of this acid for food and chemical purposes were more than ordinarily attentive to this work. As a result, a cooperative arrangement was worked out between the Bureau of Soils and the R. B. Davis Baking Powder Company, at Hoboken, N. J. This company constructed a pilot plant at their factory which was operated for nearly a year. Their interest in this electric furnace process was two-fold: first, as a possibility of obtaining a better quality phosphoric acid, and second, as a potential source of this acid for their manufacture of mono calcium phosphate used in baking powder. This would supplement the material then obtained by the wet process and result in a superior product. Their need for another source of phosphoric acid was also due to the shortage of sulfuric acid, which was then being used so extensively for war purposes. Doubtless the interest in another source of phosphoric acid predominated, since at the conclusion of the war the Davis firm failed to carry on any further development in electric furnace manufacture.

Fuel Fired Furnaces

Following work on the electric furnace smelting of phosphate rock, the Bureau of Soils, from 1917 to 1923, investigated the volatilization of phosphorus and the production of phosphoric acid in fuel-fired furnaces, as reported in detail in Department of Agriculture Bulletin No. 1179. During this investigation several types of oil-fired smelting furnaces were constructed and operated.

The Victor Chemical Works became interested in the process, and in 1924 began an investigation on pilot scale. This experimental work was carried on at their Chicago Heights plant for several years, finally culminating in a plant size blast furnace at Nashville, Tennessee, with a producing capacity of 75,000 pounds of phosphorus pentoxide per day, using the Cottrell precipitator to collect the phosphoric acid. Operation of this furnace began during 1929 and continued several years till it was replaced by a larger unit.

It is interesting to note the progress in manufacture of phosphoric acid as illustrated by the development of this company. When the blast furnace was built at their Nashville plant, a wet process was in operation there for the production of phosphoric acid. About one year after the blast furnace was started, the wet process operation became obsolete. This was about the time the larger blast furnace was built.

The Ferrophosphorus Phase

The next development in electric furnace production of phosphoric acid, followed the work of the Bureau of Soils, when in the early part of 1919 the Southern Manganese Corporation at Anniston, Alabama, began operations. During the war this company operated electric furnaces to produce ferromanganese. With the end of the war decreased demand for ferromanganese resulted in a price decline to a point making it uneconomical to use electric furnaces. Other means were sought to utilize this idle unit. The first consideration, as might be expected, was along metallurgical lines and the manufacture of ferrophosphorus was started.

Prior to this time ferrophosphorus had been made in a blast furnace similar in operation to the usual iron blast furnace, except that in addition to iron ore, flux, and coke, a charge of phosphate rock is added. Ferrophosphorus is an alloy of iron and phosphorus, and as produced in the blast furnace contained 15-19 per cent. phosphorus. It was soon found that ferrophosphorus made in the electric furnace analyzed 25 per cent. phosphorus. Here was another forward step in the manufacture of ferrophosphorus—one of quality and increased efficiency.

Ferrophosphorus was used principally as an addition to steel intended for sheet, such as is used in the manufacture of automobiles. One purpose of this added phosphorus was to prevent the sheets from sticking when hot rolled in the mill.

An interesting tabulation would be the profitable contributions made by chemistry because disagreeable waste products became nuisances. One of these would be the story of ferrophosphorus. In producing ferrophosphorus in the electric furnace a certain amount of phosphorus escaped from the furnace into the atmosphere. When phosphorus is burned in air, the dense, white fumes of phosphoric acid are formed. This naturally constituted a serious neighborhood annoyance. Accordingly, it became necessary to collect the acid in

Phosphates in every man's life

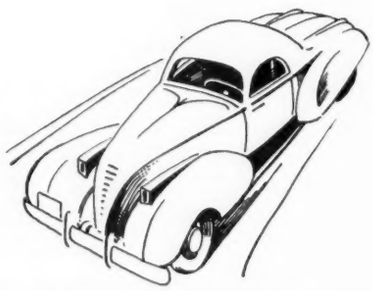
Because of phosphate, the soap cleans thoroly, rinses easily.

A BRISK morning shower refreshes Mr. Every Man. He shaves and brushes his teeth—goes downstairs to breakfast.

Perhaps he does not realize that he has already, in a dozen ways, made use of the marvelous properties of phosphoric acid compounds.

Because of them the porcelain tub can easily be kept spotless. His tooth paste and soaps contain them. They were used in dyeing his clothes. Their clear color is maintained and wear prolonged by their use in laundering.

As he enjoys his wholesome, nourishing breakfast, perhaps he is unaware that phosphate compounds have been used to clean the silver—and china—to grow and clean the fruit—to give the hot biscuit their wholesome lightness. In the production and safeguarding of the milk, phosphate compounds were used in many ways.



In refining petroleum products, phosphoric acid has been used as catalyst.

Phosphoric, "The Beneficent Acid," has been used in Parkerizing the steel parts of his car, and in Bonderizing the fenders. In making the petroleum products this kindly acid has acted the Aladdin-like role of catalyst. Even in making the shingle roof on his home phosphoric acid has played a part.

When he goes into his office, he takes for granted the neatness made possible by their cleansing virtues. His refreshing soft drink contains phosphoric acid. It is used in making the polish the bootblack uses on his shoes. The glue on the envelopes contains it. Higher boiler efficiency is attained by scale prevention due to this beneficent acid.

He has an appointment with the dentist. Phosphoric acid goes into the cement used in filling his teeth.

Every Man hurries home. Once again phosphates play their part. For dinner, he has vegetables grown with phosphate plant-foods and light-bread leavened with phosphated yeast.

Constantly industrial chemists are developing NEW uses for phosphate products. This is one company that manufactures all types of this "The Beneficent Acid"—that is solving production problems for scores of industries. Perhaps we can help you. Let's talk it over.

Phosphoric, "The Beneficent Acid."

From morning 'til night phosphates play an important part in Every Man's life.

VIRGINIA-CAROLINA CHEMICAL CORPORATION

PHOSPHATE PRODUCTS DIVISION

Richmond, Virginia

VC CHEMICALS

Phosphoric Acid, in Drug, Food, Technical and Commercial Grades. Calcium and Sodium Phosphates and Special Phosphate Compounds. (Also distributors of heavy chemicals in the South Atlantic area)

some manner, and the Cottrell precipitator was selected as the most satisfactory means for this purpose.

When electric furnace production of phosphoric acid and ferrophosphorus was started at Anniston, except for the plant of Hechenbleikner in North Carolina, the wet process was still supplying the food and chemical phosphoric acid and phosphates. Electric furnace phosphoric was of a distinctly better quality than acid produced by the wet process, and actually competitive with phosphoric acid made from elemental phosphorus. Therefore, the phosphoric acid from the electric furnace smelting operations was used in increasing quantities by industry to replace that which was made by other methods. In addition to replacing phosphoric acid made from phosphorus, it was evident that higher purity salts could be made than those obtained from the wet process acid. There was now an advantage to the consumer in the use of a higher quality phosphate

The Swann Development

The phosphoric acid made at Anniston was first a by-product of ferrophosphorus production. It was soon found, however, that the phosphoric acid could be marketed profitably which led to an increased production with a correspondingly less percentage of phosphorus produced as ferrophosphorus. Between 1919 and 1929 and until the Victor Chemical Works started their blast furnace phosphoric acid production, the operation of the electric furnace at Anniston was practically the only source of phosphoric acid other than that from the wet process. With a constantly growing market, this condition existed until about 1931.

In 1932 the organization at Anniston, which had undergone a corporate change and was then known as The Swann Corporation, began considering the manufacture of elemental phosphorus as a further improvement in the manufacture of phosphoric acid. It was believed that such a change would ultimately result in lower cost and in higher purity phosphoric acid and phosphates. With this in mind, research was undertaken, finally leading to smelting furnace methods which produced the elemental phosphorus. This work extended over several years. Although phosphoric acid was made at Anniston from 1919 on, till 1932 there was no production of elemental phosphorus. Phosphorus vapor and carbon monoxide were burned as such, and as a result, the organization had no experience in handling phosphorus. Therefore, when experimental work was started, it was necessary to get experience in all phases of manufacture and handling of phosphorus. This investigation continued without interruption up to and following the merger of The Swann Corporation with Monsanto Chemical Company in 1935.

In the course of this study the supply of phosphate rock and plant location was considered. In 1936 a plant was built and a smelting operation begun, using Tennessee phosphate matrix as a burden for the electric furnace smelting. This elemental phosphorus plant is located near Columbia, Tennessee, in the heart of the phosphate rock beds. About the middle of 1937 an electric furnace plant was completed and operations began at the same location to smelt phosphate sinter and to produce phosphorus, the culmination of carefully planned research for higher quality phosphoric acid and phosphates.

During 1937 the Victor Chemical Works announced their decision to build an electric furnace. This plant is to be located near Mount Pleasant, Tennessee, and will also make use of the local phosphate ore to produce elemental phosphorus.

During 1936 the American Agricultural Corporation, at Carteret, N. J., also began operating an electric furnace for the smelting of phosphate rock to produce phosphorus, which when burned produced phosphoric acid, from which several of the phosphate salts are made.

In January, 1938, the Phosphate Mining Company announced the successful installation of their electric furnace plant for the production of elemental phosphorus at Nichols, Florida. In this operation the native Florida rock will be used.

This chronological narrative of the evolution of phosphorus and phosphoric acid processing would be incomplete should the Tennessee Valley Authority operations go unmentioned. In addition to those industrial manufacturers already indicated who, either by the wet process, the thermal process, or the electric furnace, have contributed to this history, this governmental agency also is doing some investigating along these lines. In their work of making fertilizers and investigating fertilizer producing methods, the electric furnace smelting of phosphate ore has been extensively studied.

All these developments tend to show a common course of thought and work toward improving the quality of phosphoric acid and phosphates. The development of the electric furnace process has been a major contributing factor in this evolution.

Higher Purity Standards

The principal phosphate impurities, objectionable because of toxicity, are lead, arsenic and fluorine. In the case of lead, for instance, about the period of 1918 phosphates which contained less than 20 parts per million were more uncommon than phosphates containing more than 20 parts per million. At present it is not rare to find phosphates made from electric furnace acid containing less than 1 part per million, and it is unusual to find material which exceeds 2 parts per million. Arsenic, another toxic impurity, had at one time the tolerable limit of 1.4 parts per million. It is now exceptional to find material exceeding 0.5 part per million.

Within the last few years considerable attention has been attracted to the presence of fluorine in food prod-

ucts. This agitation has arisen largely because of spray residue from insecticides which remain on fruit and vegetables. "Mottled" teeth of children are said to be caused by the presence of fluorine in drinking water, but as there are some natural foods, which are used extensively, that contain as much as 700 parts per million fluorine, this "mottled teeth" theory may be erroneous. It is interesting to note that phosphates entering into food products contain less than 10 parts per million fluorine, and it is unusual to find a phosphate made by present methods which contains more than 50 parts per million fluorine. The recently published report No. 162 (Nov. 1937), by S. Marcovitch, G. A. Shuey and W. W. Stanley, issued by the Agricultural Experiment Station, University of Tennessee, has this pertinent conclusion to make: "Results of our investigation indicate that in practice fluorine sprayed fruit or vegetables cannot be injurious to health. The present tolerance of 0.01 grain of fluorine per pound of foodstuffs was determined upon arbitrarily because of the lack of factual basis."

New Products and Markets

In considering new products or uses which have resulted from this progress in phosphoric acid manufacture, it may be that limited or little known applications are overlooked. In general, new uses are those which formerly were extremely limited in their application.

Sodium meta phosphate is such a product, for its new uses have attracted widespread interest. This compound possesses the property of softening hard water without causing the formation of a precipitate, and extensive use has been made of this fact. As a result sodium meta phosphate is being used in softening boiler feed water, in the leather industry, in laundries and textile mills and for various other washing and cleaning operations and processes.

Tetra sodium pyro phosphate is another phosphate which is finding an increased market. Its water softening, detergent and emulsifying properties are its chief attributes. With further study, it seems likely that additional uses will be found for this versatile chemical.

Tri calcium phosphate for use as a filler or non-caking agent has become very popular for those chemical salts which have a tendency to cake in packages. For example, when tri calcium phosphate is used as a filler in salt, caking is greatly lessened or prevented.

The use of phosphoric acid for treating metal sheet to prevent rusting has increased, for its industrial application is in treating metal parts which are to be subsequently painted where good paint adherence is desired. The automotive industry consumes large quantities of phosphoric acid for treating the body parts to prevent rusting during assembly and before painting.

At the present time there is an expanding market for elemental phosphorus. With the subsequent lower cost, increasing uses will be made of it that were formerly unjustified, and phosphorus is now shipped in tank cars.

Phosphorus pentoxide—made by burning phosphorus with dry air—has also become more available and is being used in increasing quantities. A powerful drying agent, phosphorus pentoxide has found a place for itself because of this property. It is also employed as a catalyst or promoting aid in carrying out certain types of chemical reactions.

The development of phosphorus and phosphoric acid throughout the last twenty years has been greater than during all the decades since its discovery. Census figures show that production in 1919 of mono, di and tri sodium phosphate was 23,867 net tons. In 1935 this figure had been increased to 127,000 net tons. Mono, di and tri calcium phosphate had a 1919 production of 22,135 net tons, which in 1935 was 40,600 net tons.

The story of phosphorus is being written each day for improved quality, new discoveries and more varied applications create an ever increasing demand for this most interesting of chemicals.

Marketing Beryllium

By Paul M. Tyler*

Beryllium, or glucinum as it is called in England, is a very light metal having about the same density as magnesium. Although as rigid as steel and possessing other interesting properties in its unalloyed state, it seems destined always to be too expensive to be used extensively except as a hardening agent for other metals. At present the rather small amount of beryllium consumed is principally in the form of beryllium-copper alloys containing about 2.5 per cent. beryllium and having a wide variety of applications. A great deal of publicity has been given the light-metal alloys of beryllium and their possible use in aircraft, but commercial developments in this field so far have been unimportant. More promising is the use in iron alloys, particularly nickel-iron and nickel-chrome-iron, and in Germany nickel-beryllium alloys are made commercially. Beryllium oxide and sundry other compounds likewise have highly useful properties.

Master alloys have been produced in the U. S. by at least three companies and a number of others have experimented with making the metal or its alloys or compounds, but only a fraction of the present capacity of say 200 pounds a day is actually utilized.

Late in '36 the price of beryllium-copper master alloy was reduced to $23 a pound of beryllium content. The metal, although not produced in the U. S., is available in laboratory quantities for around 500 marks a pound. Beryllium oxide, fluffy, 99.8 per cent., calcined at 1,450° C. for refractory crucibles and electrical insulators can be bought at $4 a pound in 100-pound lots.

The only commercial ore of beryllium is beryl, which occurs in commercial quantities only in pegmatites and occasionally is a byproduct of feldspar- or mica-mining. This extraordinarily hard mineral is a beryllium aluminum silicate that contains theoretically about 5 per cent. of the element or 14 per cent. of the oxide, BeO.

* *Chief Engineer, Nonmetal Economics Division, U. S. Bureau of Mines.*

For the Lacquer Manufacturer

DIBUTYL PHTHALATE
DIETHYL PHTHALATE
DIMETHYL PHTHALATE
DIPHENYL PHTHALATE
SANTICIZERS (Plasticizers)
SANTICIZER 8
Ethyltoluenesulfonamid
SANTICIZER 9
Orthoparatoluenesulfonamid
SANTICIZER 10
Orthocresylparatoluenesulfonate
SANTICIZER E-15
Ethyl phthalyl ethyl glycollate
SANTICIZER B-16
Butyl phthalyl butyl glycollate
SANTICIZER M-17
Methyl phthalyl ethyl glycollate
SANTICIZER 1-H
Cyclohexyl paratoluenesulfonamid
SANTOLITES (Synthetic Resins)
SANTOLITE MHP
Sulfonamid aldehyde resin
SANTOLITE MS
Sulfonamid aldehyde resin
SANTOLITE K
Sulfonamid aldehyde alkyd resin
PHTHALYL GLYCOLLATES
TRIBUTYL PHOSPHATE
TRICRESYL PHOSPHATE
TRIPHENYL PHOSPHATE

For the Resin Manufacturer

PHENOL
PHTHALIC ANHYDRIDE
MALEIC ANHYDRIDE
AROCLORS (Chlorinated Diphenyl)

Solvents

AMYL ACETATE
BUTYL ACETATE
ETHYL ACETATE
DIACETONE ALCOHOL
MERSOL (Solvent Alcohol)
COTTON SOLUTIONS

CHEMICALS OF QUALITY
Monsanto
ST. LOUIS, U.S.A.

Monsanto Chemicals

DEPENDABLE

Monsanto Chemical Company
St. Louis, U.S.A.

NEW YORK CHICAGO BOSTON CLEVELAND BIRMINGHAM
CHARLOTTE SAN FRANCISCO LOS ANGELES MONTREAL

Through the Centuries with Alkalies

In the American Colonies soap-making was at first largely a household art. The housewife saved the wood-ashes (soda) from the great fireplaces and the grease from the kitchen. By pouring water over the ashes lye was made. The lye and grease were then boiled together until the compound was strong enough to hold up an egg. This strong soft soap was kept in a wooden soap box in the kitchen where it was available alike for Saturday night baths and the family laundry. Later on caustic soda was bought at the grocer's and mixed with hot fat and grease for the home-made soap.

Such resourcefulness and thrift as the Colonial housewife practiced is of vital importance to American business today. In the face of mounting costs and heavy taxation, executives are checking sources of supply with great care and buyers of raw materials are testing quality as never before. As a supplier of Soda Ash, Caustic Soda, Bicarbonate of Soda, Modified Sodas, Calcium Chloride and Liquid Chlorine, serving many major industries, The COLUMBIA ALKALI CORPORATION welcomes this challenge and this responsibility. Its officers and staff pledge themselves anew to deliver the utmost in product, value and service.

SODA ASH
CAUSTIC SODA
SODIUM BICARBONATE
MODIFIED SODAS
LIQUID CHLORINE
CALCIUM CHLORIDE

COLUMBIA

THE COLUMBIA ALKALI CORPORATION

BARBERTON • OHIO

NEW YORK CHICAGO BOSTON PITTSBURGH
CLEVELAND CINCINNATI ST. LOUIS MINNEAPOLIS

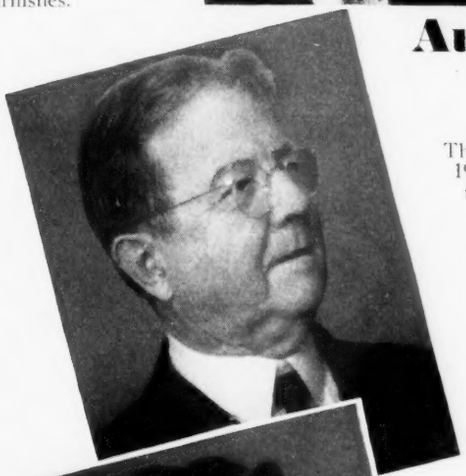
Archie J. Weith (Bakelite), coated and impregnated fabrics; center, John Marshall (du Pont), paints, lacquers and varnishes.

Left, D. P. Morgan (Scudder, Stevens and Clark), chemical finances; below, Frank G. Breyer (Singmaster and Breyer), non-ferrous metals.

Author!

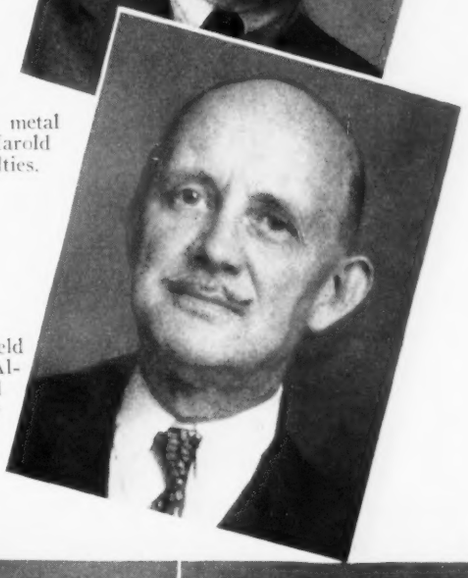
Author!!

The authors of "Creating Industries, 1918-38" foregathered at the Chemists' Club recently to discuss this important review of chemical progress since the World War, which began in the February issue, and which becomes a regular feature with this number.



Left, A. Cressy Morrison (Carbide), chemical tariffs.

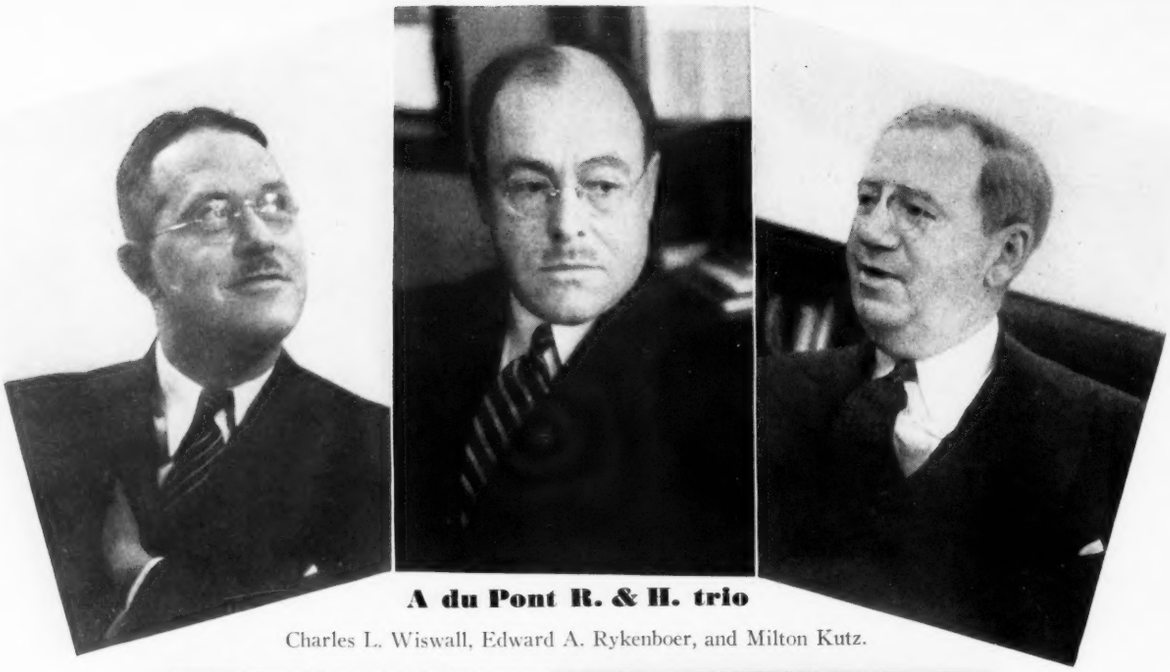
Left, Walter L. Savell (Mathieson), metal cleaning; right, Dr. Joseph F. X. Harold (Grosvenor Labs.), textile specialties.



Below, left to right, Crosby Field (Flakice Corp.), refrigerants; Albert E. Gessler (Interchemical Co.), inks; George Barsky (Barsky & Strauss), synthetic plastics, and L. H. Enslow (Chlorine Institute), water purification.

Attractive exhibits at the Packaging Exposition, held recently in Chicago and reported in our April issue, are shown on this and opposite page. Also on this page are two chemical specialties packages which were awarded prizes.

GLUING MACHINES
SYLPHRAP
ARABOL
TIGHTWRAP GLUES
CARTON SEALING
CONTAINER
LABELING
SET UP AND
FOLDING BOX
CELLOPHANE CEMENTS
MODERN ADHESIVES for MODERN PACKAGES
There is an ARABOL PRODUCT FOR EVERY PURPOSE
50 YEARS
Packaging Show Exhibits
S & S FILLING MACHINES
S & S
STOKES & SMITH CO



A du Pont R. & H. trio

Charles L. Wiswall, Edward A. Rykenboer, and Milton Kutz.

Planning American Agricultural Chemical Company's chemical sales. Left, George E. Riches, manager chemical department; right, G. W. Gaffney, advertising manager.

The first carload of liquid chlorine shipped out of the new plant of Southern Alkali at Corpus Christi, Tex. Shipment was sent to the City of Dallas, and the picture was taken in front of the city's filtration plant. Standing in front of the car are K. C. Frazier, southwestern manager, and E. M. Rollins, both of Southern Alkali.

ADVERTISING PAGES REMOVED

Plant Operation and Management

A digest of new methods and plant equipment

Selecting the Source of Supply

By Robert C. Kelley

Purchasing Agent, Converse Rubber Co.

SELECTION of sources of supply for raw materials, processed materials, and fabricated articles for industrial use is one of the purchasing agent's most important functions. In these times, when the general welfare is much concerned with continuing and steady employment of labor and productive facilities, the economic and social consequences of selecting sources are most far-reaching and important.

There are those to whom the actual buying process means merely the obtaining of quotations from a group of preselected, reliable sources of supply, followed by the naming of the lowest responsible bidder as the source. Many public buyers are limited by statute to this very process. If it were followed without deviation on every purchase, we could find ourselves in a situation where the supplies of materials received would be as heterogeneous as Joseph's coat of many colors. In industrial buying, continuing sources are very important to insure uniformity in processing.

Eligible bidders should be qualified as financially responsible, capable of meeting the specifications, located at a point near enough to the buyer's plant to insure deliveries as desired, and should have a reputation for living up to their delivery promises.

How is the buyer to cover all these points about sources? *Dun and Bradstreet*, and *Thomas' Register* or *MacRae's Blue Book* will reveal their capital rating and credit standing; testing of samples may determine their ability to meet specifications; plant capacity, stocks on hand, and capacity to make deliveries on time may be gauged by plant visits, stock lists, and the buyer's own records. Nor must we overlook the value of contacts with other purchasing agents through the National Association of Purchasing Agents.

Such a program seems comprehensive, but it does not exhaust all of the possibilities nor does it complete the job. A cross-section picture of the industry of which the source is a part must be analyzed closely if the material in question is regarded as a major item. The following factors should be determined:

1. Total production of the material.
2. Approximate share of the volume held by each supplier.
3. Distribution of accounts among competitors.
4. Price policies of the industry in question. Is there a trade association in the group? How well does it function?
5. Financial ratings of the sources.
6. Interownership of companies which outwardly appear to be competitors.
7. Terms of payment. Are they uniform among all producers?
8. Efficiency of the various companies. Who are the low-cost producers?
9. Geographical location of plants.
10. Cost of delivery, if not included in price.

This may seem like a formidable store of information to seek, but, in our experience, it is necessary if the buyer is to do a real job of purchasing on a major item. To obtain it he must literally go into the backyard of the individual industry and study it from close range, learning all about its weaknesses and its bulwarks. Constant perusal of the trade papers in the field where the suppliers "talk shop" is advisable. Many interesting buying problems have been solved by recourse to this outline of analysis.

The question of balance of power between sources of supply may not be considered by many purchasing agents when selecting suppliers, but we have observed that it is a very vital factor in many industries. Certainly the supplier who is not getting his share of the volume and who consequently has surplus plant capacity, will offer more inducements to get an account than another whose output is pretty well taken by other customers. Where there is a group of suppliers with one or two powerful concerns known to be the dominating factors, a judicious placing of business with one or two of the smaller ones is often the means of keeping a competitive situation alive. Many buyers are themselves to blame for monopolistic situations because they show poor judgment in distributing their volume.

How many buyers keep accurate records showing how their purchases are distributed among their sources? This is a record easily compiled, and has many valuable uses. It serves as a warning if purchases are becoming too closely confined to one or two sources, and acts as a stimulus to recheck competitive situations. Suppliers are encouraged to strive harder to obtain the business when the buyer can tell them accurately what his dollar volume amounts to in various fields. It also conveys a message to the salesman who calls too frequently and spends too much sales effort to get business, which, if he got all of it, would not pay him for the effort required.

Long-term contracts with suppliers have been popular with many buyers. Without decrying the value of these arrangements, it can be pointed out from experience that there is danger involved in closing the door to competition and new developments. Sources need constant checking; processes change; concerns liquidate and new ones spring up. Even where a long-term contract seems advisable, it is best to leave a part of the volume available for open-market transactions. Friendly and courteous relations with all sources are great assets to the buyer, because he never knows when he may need good will and a friendly attitude.

This brings up the social and economic aspects of selecting sources of supply. Should the purchasing agent be concerned with them? A case illustrates this point. The buyer went personally to a source in another State to place a large contract. He had an opportunity to view the effects of his act from first-hand observation. He heard the telephone calls for the operatives to come to work, saw the covers come off idle machinery; and saw the wheels begin to turn. He personally looked upon employment and purchasing power created by his action.

Is not this what happens every time a buyer places an order, even though he does not witness it in person? And is not the opposite true when a buyer leaves one source of supply and takes on another? Of course it is, for labor is not a mobile commodity which can be shifted from place to place as is done with orders. I do not advocate a sentimental attitude on the part of the buyer. "Goods should be made where they can be manufactured best and cheapest" is sound economic doctrine, and barring tariff walls, that is where they will be made. But certainly a close knowledge of sources can do much to alleviate unnecessary shifting of production, with its resulting economic hardships.

What of selecting sources when all are equal on price, quality, and service? Some buyers rotate orders among many pur-

Abstracted from *Executives Service Bulletin*, Feb., '38, p. 5.

veyors, instead of picking one source and staying with it, hoping to make the others offer inducements to get the business. The sounder way is to make an analysis of the situation, which frequently will disclose that what appears to be equality on the surface is not equality in fact. Good buying judgment based on sound analysis, supported by practical experience, is what counts. Very often service is the variable factor, and this factor has many ramifications.

To the layman, service means prompt delivery, yet to the industrial purchasing agent it has far greater significance. It embraces such types of service as engineering on product design, laboratory research and development, maintenance of equipment already sold, carrying of inventories, transportation facilities, and market information. Each type has a value which must be assessed in selecting a source.

Many purchasing agents dismiss this source-of-supply question by saying: "Take your customer's list; that is all it amounts to," which brings up the highly controversial subject of reciprocity. But is reciprocity as bad as it sounds? Is there anything in the policy of favoring customers of your company to prevent the buyer from exercising his prerogatives of demanding quality, service, and price? Does not the practice itself require the buyer to be more diligent than ever in his investigation of sources? It is my belief that it does.

With the number of technically trained and production men in purchasing today, it is only natural that many buyers use these talents in dealing with their sources of supply. It is not unusual in these times for purchasing agents to suggest changes in products, methods of distribution and production to their suppliers. It all helps to cement relationships which pay dividends far beyond those secured when purchases are made, through routine buying, at prices a few pennies cheaper. I recall that Professor E. H. Schell, of the Massachusetts Institute of Technology, pictures in a recent survey the purchasing agent as a man of trade who goes into the market, ferrets out information, reads about it, studies it—in fact, literally lives with it. He is always on the job, but not always at the job. He has many friends in all lines of business activity; friends who welcome the opportunity to sit down with him and discuss business and economic problems.

The salesman stands at the buyer's desk; he mentions his company and his product. These two bits of information frequently will conjure in the buyer's mind the picture of an entire industry, and this company's particular niche in it. When he can start an interview with that background, how much greater are the possibilities! Which brings us to the conclusion of those observations, "Know your resources and you will choose them well."

Improved Cadmium Yellows

A process for production of cadmium yellows of improved properties is covered in D. R. P. 652,177 (*Chemical Trade Journal*, Feb. 18, '38, p. 134). The inventor precipitates the cadmium from aqueous solutions of its salts with the esters of dithiocarbonic acid, representative precipitating agents mentioned being methyl or ethyl xanthates, or cellulose xanthate (viscose). Precipitation can advantageously be effected in alkaline solution; that is, in presence of ammonia or an alkali hydroxide. The shade of the precipitate varies with the reaction temperature, ranging from a bright-greenish yellow at lower temperatures to a distinct reddish yellow at higher temperatures. The fact that by working at ordinary temperatures, it is possible to produce cadmium yellows in greenish tones of high purity is given as one of the outstanding advantages of the method. The pigments produced are also of low specific gravity and softness, and of high stability to light and heat; while they possess great brilliance and color strength.

Increasing Viscosity of Road Tars

Use of lime for treatment of road tars to increase the viscosity and the resistance to flow of the tar is the subject of E.P. 471,216, and is described in a recent issue of the *Gas Journal*. It was found that when heated moist tar is treated with lime there are formed lime salts of the tar acids intimately dispersed throughout the tar so that its viscosity may be enormously increased and the lime salts of the tar acids remain permanently in suspension. The rise in viscosity so produced may exceed 100,000 fold.

In addition, the tar is radically altered in another aspect, for it no longer behaves as a perfect fluid. It acquires an appreciable rigidity so that a considerable force must be applied to produce a deformation of the material—a property not possessed by normal coal tars and pitches. The tar has a structural framework which gives it not only increased viscosity due to the presence of insoluble matter, but also plastic or thixotropic properties, the latter due to the fact that the structure is easily broken by mechanical disturbance of the material, but is restored again on standing. This thixotropic property enables the cold tar to be stored, transported, and applied to stone and other materials in ways not possible with normal tar.

Mercury-Arc Rectifiers

Particulars of the mercury-arc rectifiers in use at the Trail plant of Consolidated Mining & Smelting were given in an address (*The Electrical Review*, Dec. 24, '37) by A. G. Dickinson at a recent meeting of the Canada Electrical Association.

Each unit consists of two 5,000-A tanks operating in parallel from one rectifier transformer. Three installed in 1929 in the zinc works are of 5,600 kw at 460-560 V, and three installed in 1931 at the hydrogen plant are of 6,700 kw at 600-670 V. Two others with outputs of 8,300 kw at 740-780 V were put into use at the hydrogen plant last year, and a similar one is on order.

In the zinc works the voltage is first stepped down from 60 kV to 13.2 kV; the rectifier transformers are provided with on-load tap-changing switches on the high-voltage windings to give twenty-four voltage steps. In the hydrogen plant voltage-regulating transformers are installed on the 60 kV bus just before the rectifier transformers.

The production of hydrogen by electrolytic decomposition of water requires a large amount of d.c. power. When the hydrogen plant rectifiers first went into operation, the suppression by means of grid control of backfires was not as satisfactory as expected. Tests to ascertain the value of current flowing back from the hydrogen cells on short-circuit gave 28,000 A as a maximum, and the d.c. breakers were not fast enough in operation, so that once a backfire occurred the grid control device could not interrupt the arc until the d.c. feedback from the cells and between cylinders was stopped, but high-speed d.c. breakers in the cathode connection to each cylinder improved the performance. Closed-circuit cooling systems replaced the original tap-water cooling. In the 1936 installation eighteen-anode rectifiers were supplied instead of twelve as in all other instances.

In some cases several months' satisfactory full-load operation was obtained before troubles warranted changes in the equipment. In 1935, when six rectifiers were in commission, there were only twenty-seven backfires in the hydrogen plant and thirty-six in the zinc.

Operating and maintenance costs for the hydrogen plant rectifiers came to $14,000 ($7,280 operation and $7,020 maintenance), giving $0.713 per kw installed. For the zinc plant rectifiers, the figure was $15,600 or $0.929 per kw, and for the rotaries and motor generators $36,000 or $0.947 per kw. Average overall efficiencies for the zinc works were 86 per cent. for the motor generators, 96 per cent. for the rotary converters and 93.5 per cent. (including 1.3 per cent. loss in the rectifier transformer) for the rectifiers.

THE following abstracts have been taken from papers presented before the Division of Industrial and Engineering Chemistry, American Chemical Society, last month, at Dallas, Tex.

Bleedwater for Reuse in Sulfur Mining

In the Frasch process of mining sulfur large volumes of super-heated water are pumped underground to melt the crystalline sulfur. In order to prevent the pressure in the formation from building up to excessive amounts, water has to be drained from the salt dome caprock as the sulfur is removed. This water, known as "bleedwater," has to be treated to remove objectionable constituents before being wasted. Bleedwater at Hoskins Mound has a temperature ranging from 220° to 250° F. and until the present study was started accounted for great thermal losses. This water is now mixed under pressure with fresh water heated to 355° F. in the power plant in proportions that will give water having the desired mining temperature. This water has a pH of 6.5 and contains large amounts of hydrogen sulfide and other acid constituents which make it very corrosive to steel and other materials that can economically be used in sulfur mining. To prevent this corrosion effected by bleedwater and allow it to be re-used, methods of treating with chemicals such as lime, barium chloride, and disodium phosphate, which cause scale to be deposited on the equipment, have been developed. These scales seal off pipe lines and equipment surfaces from the water, thereby preventing corrosion. Authors of this paper are D. T. McIver, J. B. Chatelain, and B. A. Axelrod, Freeport Sulphur Co.

Phenols from Cornstalk Alkali Lignin

The preparation of phenols from cornstalk alkali lignin by destructive distillation and separation by fractional distillation was discussed by G. Leon Bridger, Iowa State College. Alkali lignin from cornstalks has been destructively distilled under varying conditions of time, temperature, method of heating, and pressure. The conditions for optimum phenolic tar yield at an absolute pressure of 5.5 inches of mercury are (1) a final retort temperature of at least 400° C.; (2) a time of heating sufficient to allow all the distillate to come over, the rate of heating not being important; (3) any convenient means of heating the retort, a direct flame giving as good results as a heating bath. The optimum pressure found for production of phenols was 2.2 inches of mercury absolute, although still lower pressures would probably prove better. The phenols were fractionally distilled in an efficient column both from the crude tar and from the chemically extracted phenolic portion of the tar. It was found possible to fractionate 40 to 55 per cent. of the tar into constant boiling cuts. These fractions were identified in large part; phenol, o-cresol, p-cresol, guaiacol, o-ethyl phenol, thymol, and eugenol were found. The presence of several xylenols and p-ethyl phenol was shown to be probable. Alkali lignin must thus be considered a potential source of phenols which may become important in the future.

The most pressing need at present for commercial adoption of the process is a more economical means of producing the alkali lignin or recovering it from waste liquors of paper and pulp mills. Several processes have been proposed and the most promising ones are now under investigation. It is believed that a satisfactory process will be available in the near future.

Chemistry of Trona Process

In working out the basic data for any particular "system" or group of compounds, physical chemists have found a very useful tool or guide known as the "Phase Rule." This rule is the expression of a simple, fundamental, mathematical relation which has been found to exist in connection with the number of substances present in a "system" and the number of possible, separate combinations that can simultaneously form therefrom.

The Searles Lake System of salts and brine is regarded as having nine components, three degrees of freedom and six solid phases. Author, W. A. Gale, American Potash and Chemical Corp., presented equilibrium diagrams to show the behavior of major components upon isothermal evaporation and to illustrate the Trona process. At low temperatures the precipitation of the double salt glaserite, $[K_2Na(SO_4)_2]$, prevents a separation of potassium and sodium salts, whereas at high temperatures only sodium salts are precipitated. The hot concentrated liquor is removed and cooled rapidly to crystallize KCl, while maintaining supersaturation with respect to borax, which is crystallized before returning the mother liquor to the cycle.

In the operation of the process, careful control of temperatures and concentrations are required in order to insure proper efficiency of separation and purity of product. During the development stages for the establishment of the necessary conditions for such operation, the Phase Rule has proved an indispensable aid without which very little, if any, progress could have been made on problems of such complexity as many of those encountered by the research chemists at Trona.

Muriate of Potash from Searles Lake

In 1912 Searles Lake in the heart of the California desert offered a potential source of potash, borax, soda ash, sodium sulfate, and common salt. Twenty-five years later, through a large expenditure and the combined efforts of managers, chemists, engineers, and others, there is at Trona a manufacturing plant producing in excess of 1100 tons of chemicals daily with a village to house the operating forces.

The brine is pumped from wells sunk in the porous salt body of the lake, four miles to the plant, where it is mixed with various end liquors resulting from the previous operation of the process. This mixture is then fed into triple effect evaporators where the water is boiled off. The sodium salts crystallize and are settled out and filtered from the liquors. The potassium chloride and borax are retained in the concentrated liquor.

Carefully controlled cooling of this liquor, with necessary settling and filtration steps, separate the potassium chloride from the borax and other impurities. The potassium chloride, known in the trade as "muriate of potash," is then ready for use in preparation of commercial fertilizers for the farmer. Year in and year out this production analyzes 97 per cent. potassium chloride.

Last year Trona supplied more than 40 per cent. of the U. S. production of potash, at the same time producing perhaps 40 per cent. of the world's consumption of borax and boric acid, together with substantial amounts of soda ash and salt cake. Paper by R. W. Mumford, American Potash & Chemical Corp.

Paint and Varnish Specifications

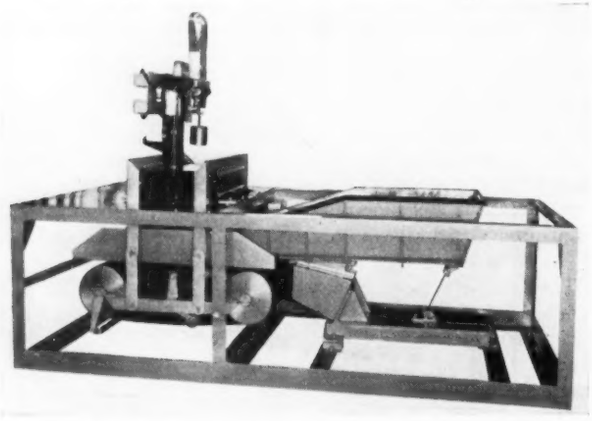
It is extremely unfortunate that the skilled craftsman in the building trades, particularly the painter, is rapidly disappearing, and in some sections of the country he is almost extinct. The apprentice system in the building trades is dying out for want of replacements and the skilled craftsmen of a generation ago are rapidly disappearing.

Because paint is such a complex chemical product, whose manufacture and design together with application must be carefully controlled by experienced chemists as well as craftsmen if the most satisfactory results are to be obtained, large business and governmental organizations which are required to purchase paints upon open specification should secure technicians trained in manufacture, testing, and design as well as in application, to direct and control a complete paint program. If governmental organizations will allow these technicians to work out the programs in the simplest and most direct engineering manner, without political interference and skull-duggery, then the supposedly difficult problem of securing paints upon open specification with freely competitive bidding will be simplified and the taxpayers' money will yield more visible results. Pursuance of this idea will open a broad new field for paint technicians. Author, L. A. Zinser, paint chemist, Texas State Highway Dept.

New Equipment

Continuous Weigh Feeder

An automatic, continuous weigh feeder that provides a steady flow of bulk materials such as coal, dry chemicals and food stuffs by weight per hour to a constant, close accuracy is being manufactured by Syntron Co., 420 Lexington Ave., Homer City, Pa. Machine is made up of a vibratory feeder conveyer discharging onto a constant speed belt conveyer suspended from a scale having sensitive electric valves. A constant load, by



weight, is maintained at all times on the constant speed belt conveyer, by the ability of the vibratory feeder to speed up or slow down its discharge as controlled by the electric valves which function on the slightest under-weight or over-weight movement of the scale beam. The scale functions purely as a scale, exerting no mechanical power to operate its electric control valves. The vibratory feeder is of the pulsating, electromagnet type, conveying bulk material by vibration, so it flows like water.

Drain Pipe Cleaner

A gun for opening clogged or partially clogged pipes, toilets, gas and oil lines, water and supply pipes, etc., in quick time, is being handled by Parker S. Atwood, 6 Bradley Ave., East Haven, Conn. The Hydromatic DPC is portable, hand-operated, and weighs less than 9 pounds. It comes complete with 14 different accessories that will open over 98 per cent. of clogged conditions, and operates on the hydraulic-pneumatic principle.

Cellulose Dissolver

A new dissolver, used in the rayon industry, but which is also well adapted to the dissolving of cellulose of all types, as well as many other products, has been added to the line manufactured by Patterson Foundry and Machine Co., East Liverpool, O. New machine is built in undergeared type to be used where low headroom makes necessary the lowest possible overall height of the machine. It is available in both plain and jacketed types and in a number of sizes.

Dropping Test Set for Zinc Coatings

The zinc dropping test set made by Hanson-Van Winkle-Munning, Matawan, N. J., is used for determining the thickness of electroplated zinc coatings by the Hull & Strausser method. Method is simple, requiring only a few minutes to make a determination, and the readings are sufficiently accurate for control purposes.

Combustible Gas Indicator

A combustible gas indicator for measuring directly the combustibility and explosibility of gas-air mixtures has been developed by Davis Emergency Equipment Co., 55 Van Dam St., New York City. It is used for measuring flammability of the atmosphere in tanks and other containers of flammable liquids and gases, ship holds, man-holes, conduit systems, and other places where flammable gas-air mixtures may be found.

Radiation Pyrometer

A radiation pyrometer which uses as a temperature-sensitive unit, the Ardometer, is being offered by Bristol Co., Waterbury, Conn. Instrument measures surface temperature of hot objects or masses above 1,000° F., when the Ardometer unit is sighted, so that it picks up the heat rays emitted. The temperature is recorded on a round- or strip-chart recorder—or is indicated on a millivoltmeter pyrometer. It can be sighted directly on the object in the furnace, and in this position it measures instantly the temperature of the object itself.

Dry Type Air Filter

The Wire-Klad Air Filter, a new dry type possessing unusual advantages for industrial and domestic air conditioning, is announced by Staynew Filter Corp. It has the particularly desirable feature of flame-resistance—fulfilling the provisions set forth in Section 150 of the National Board of Fire Underwriters, Pamphlet No. 90. Thus, its installation is practical in many instances where fire hazard might otherwise exist. Several kinds of filtering media to suit varying conditions are available. The most usual are cotton or a wool felt-like material known as Feltex.

Dust Control Unit

Plant managers in the chemical process industries, interested in ridding their plants of objectionable dusts, completely, safely and inexpensively, will find the new dust control unit, Dustrol, a useful aid in solving this problem. Manufacturer, Falstrom Co., Passaic, N. J., states it is a complete, self-contained unit for collecting, separating, and filtering dusts. No extra blowers, motor drives, or collectors are required. Unit operates only when necessary, reducing power costs; may be easily added or moved; no extra labor is required; and it is always in machine operator's care.

Portable Cooling Unit

For use in baths or tanks where it is desired to maintain bath temperature at or below room temperature with an accuracy of plus-minus 10, a portable cooling unit, pictured herewith, has been designed by American Instrument Co., Silver Spring, Md. It is said to be especially advantageous for warm-weather operation of constant temperature baths. Unit consists of a suitable refrigerator unit fitted with a cooling coil and expansion valve. The refrigerator is mounted in a perforated metal housing. The cooling coil is connected to the refrigerator by seamless flexible metal tubing. The expansion valve is automatic in operation and requires no attention. The refrigerator measures only 12 x 15 x 21 inches high, and, being mounted on ball-bearing casters, may be moved about easily.

Booklets & Catalogs

How to get these booklets: Companies will be glad to supply copies free, provided "Chemical Industries" is mentioned and the request is made on company stationery. Your business title should also be given.

A-C Magnetic Switch, Size One, CR7006-D40, full-voltage starter for induction motors, Bulletin GEA-841-H; features and illustrations. General Electric Co., Schenectady, N. Y.

Aluminum News Letter, March, 1938, reports latest industrial applications of aluminum. Aluminum Co. of America, Pittsburgh, Pa.

Automatic Oil Circuit Recloser. Bulletin GEA-2003B, on Type FP-19, designed for protection of suburban, branch, and rural lines; applications, construction, and operation featured. General Electric Co., Schenectady, N. Y.

Bailey Boiler Meters. Bulletin, 32 pp., an analysis of 7,000 combustion tests made during past 12 years on all types and sizes of boilers, including full range of fuels and methods of firing; extremely valuable for every combustion engineer concerned with steam power plant problems. Bailey Meter Co., Cleveland, O.

Ball and Pebble Mill Operation. Booklet, of special interest to users of this type of equipment; contains complete summary of correct system of grinding to insure faster and better results. Paul O. Abbe, Inc., Little Falls, N. Y.

Belt Conveyor Idler. Bulletin No. 80, details line of Timken bearing equipped idlers, said to be only ones so constructed that exact adjustment of bearings can be made at factory and rolls mounted in brackets in field without altering or changing adjustment in any way; prices, weights, etc., given. C. O. Bartlett & Snow Co., Cleveland, O.

Cam-operated Master Switches. Type CR3012, Bulletin GEA-1283A, complete description. General Electric Co., Schenectady, N. Y.

Car Pullers and Hoists. Leaflet, details construction features, sizes and capacity of various types in company's line. Fridy Hoist & Machinery Co., Mountville, Pa.

Consolidated Odor Adsorber. Booklet, on subject of solving odor removal problems with this new unit. Consolidated Air Conditioning, 114 E. 32d st., N. Y. City.

DeLuxe Thermo-grip Electric Soldering Unit. Folder, announces new units for all types of soldering work; operate electrically, eliminating necessity of using an open flame; illustrated; specifications. Ideal Commutator Dresser Co., 1226 Park ave., Sycamore, Ill.

Dew-point Potentiometer. Bulletin GEA-2630, describes equipment for determining moisture content of gases, outlines application and operation. General Electric Co., Schenectady, N. Y.

Directional Distance Relays. Bulletin GEA-2170A, on Type GCX, three-phase, operating on reactance; features outlined. General Electric Co., Schenectady, N. Y.

Dust Control and Blast Cleaning Equipment. Folder, invites discussions on dust problems with company's engineers, recommends company's method, illustrates typical installations. Pangborn Corporation, Hagerstown, Md.

Dyestuffs. March, 1938, features use of National Nacconal NR in leather processing; contains other valuable data for those encountering dyeing problems. National Aniline & Chemical Co., 40 Rector st., N. Y. City.

Filter Presses and Diaphragm Pumps. Catalog No. 38, designed more as an instruction manual on selection and proper operation of filtration equipment; complete descriptions, accompanied by illustrations, diagrams, specifications, sizes, and capacities; useful guide to improve filtration process and product quality. T. Shriver & Co., Hamilton st. & Franklin ave., Harrison, N. J.

Floor Truck. Circular No. 232, outlines many exclusive features of truck designed to allow easy steering and rolling, with minimum amount of end tipping. Lewis-Shepard Co., 245 Walnut st., Waltham, Mass.

Gear Motors. Bulletin GEA-1929A, illustrates 21 low-speed drives that have been economically modernized with these motors. General Electric Co., Schenectady, N. Y.

Generators and Exciters, direct-current, Type CD, Bulletin GEA-432C, features, illustrations, specifications. General Electric Co., Schenectady, N.Y.

Heyden List of Products, up-to-the-minute list of firm's principal products, alphabetically arranged, forming convenient index for users of these chemicals. Heyden Chemical Corp., 50 Union sq., N. Y. City.

High Accuracy Commercial Testing Instruments. Bulletin GEA-2823, describes Types P-3 and DP-2 for measurement applications where high accuracy and precision are required with durability and portability. General Electric Co., Schenectady, N. Y.

H-O-H Lighthouse, April, 1938, feature article, "Hotel Waters," a careful study of water conditions and problems encountered in small and large hotels. D. W. Haering & Co., 3408 Monroe st., Chicago, Ill.

Instruments in Industry. GES-1841, Vol. 1, No. 1, publication devoted to extending benefits of electric instruments. General Electric Co., Schenectady, N. Y.

Interval Timer. Leaflet, on Model A type, synchronous motor driven, designed for installation as an integral part of various electrical appliances and equipment operative on a predetermined basis; illustrated. R. W. Cramer & Co., 67 Irving pl., N. Y. City.

Johns-Manville Bonded Built-Up Roofs. Booklet, revised edition, includes information on latest types of built-up roofing and insulation, gives various methods of base and cap flashing, and diagrams which show how flashing should be installed; table of condensed specifications provides quick and accurate information. Johns-Manville, 22 E. 40th st., N. Y. City.

Mechanical Topics. First Quarter, 1938, metal users, fabricators, and designers interested in solving difficult mechanical problems will find this publication especially helpful. International Nickel Co., 67 Wall st., N. Y. City.

Merck Report. April, 1938, chiefly of pharmaceutical interest, with comments on price trends of important drugs and chemicals. Merck & Co., Rahway, N. J.

Metso Sodium Silicate. Booklet, points out in interesting manner the wide range of uses to which this cleanser is advantageously adapted, aptly earning title of booklet, "From a Locomotive to a Pig"; instructions and formulas for use in many cleaning processes given. Phila. Quartz Co., 121 S. Third st., Phila., Pa.

Modern pH and Chlorine Control. Booklet, practical and theoretical information for everyone interested in pH, chlorine and phosphate control and in water analysis; fields of application discussed; company's line of equipment for this purpose fully described. W. A. Taylor & Co., 872 Linden ave., Balto., Md.

Monel Gaskets, Pump Parts, Valve Trim, designed to give new life to old equipment, booklet, complete descriptions, features, and photographs of installations. International Nickel Co., 67 Wall st., N. Y. City.

Monsanto Current Events. March-April, 1938, feature: "The Colorful Story of Plastics in Which Fiberloid Has Been a Pioneer"; tying in with recent acquisition by Monsanto of Fiberloid Co. Monsanto Chemical Co., St. Louis, Mo.

Nickel Steel Topics. April, 1938, features graphic story of value of nickel alloy steels in the oil industry; reports latest developments in use of these alloys. International Nickel Co., 67 Wall st., N. Y. City.

Norblo Screen Type Dust Arrester. Folder, complete description, illustrations, and specifications. Northern Blower Co., W. 65th st., south of Denison, Cleveland, O.

Outdoor Oil-blast Circuit Breakers. Bulletin GEA-2426A, on Type FLO-1, includes operating mechanism and dimensions. General Electric Co., Schenectady, N. Y.

Oxyacetylene Tips. April, 1938, profitable new ideas for users of Linde Products. Linde Air Products Co., 30 E. 42d st., N. Y. City.

Packings for reciprocating and centrifugal hot and light oil pumps with hard and medium hard steel plungers; valve stems, etc., folder, large illustrations and concise descriptions, with engineering data, conveniently arranged. Crane Packing Co., 1800 Cuyler ave., Chicago, Ill.

Pipe and Stud Extractor. Folder, outlines simplicity of construction, immediate application and positive action which eliminate all preparatory steps required in backing off broken pipe, belts, and screws. Reps Tool Co., 220 Delaware ave., Buffalo, N. Y.

Process Industries Quarterly. First Quarter, 1938, depicts use of solid nickel and nickel-clad steel in constructing equipment for many chemical process industries. International Nickel Co., 67 Wall st., N.Y. City.

Pyranol Capacitors, for low-voltage industrial applications, 230, 460, and 575 volts, Bulletin GEA-2742, descriptions, specifications, and illustrations. General Electric Co., Schenectady, N. Y.

Pyromaster Round Chart Potentiometers. Bulletin No. 507, describes operating characteristics of this equipment as adapted to various other units. Bristol Co., Waterbury, Conn.

Respirator for Lead and Type A Dusts. Catalog Style 92, describes new equipment for use in lead dust generating trades, which has been approved by U. S. Bureau of Mines. Chicago Eye Shield Co., 2300 Warren blvd., Chicago.

Silicate P's & Q's. April, 1938, discusses importance of silicates in various cleansing processes. Phila. Quartz Co., 121 S. 3d st., Phila., Pa.

Single Disc Junior Filter. Leaflet, covers Type No. 40-1, complete description of this simplified model that can be expanded from a single disc to a multiple unit simply by adding filter screens; illustrated; specifications. American Seitz Filter Corp., 480 Lexington ave., N. Y. City.

Six Minutes with Six Metals. Booklet, a quick guide to characteristics and uses of rolling mill and foundry products, including also special alloys, as well as Monel and nickel. International Nickel Co., 67 Wall st., N. Y. City.

Standard Towers and Accessories. Bulletin C-1, describes in detail and gives constructional data on all types of Reaction, Absorption, Fractionating, etc., Towers made of Haveg; also complete information on physical and chemical properties. Haveg Corp., Newark, Del.

Synthetic Organic Chemicals. April, 1938, feature: "Heterocyclic Systems in Dye Chemistry." Eastman Kodak Co., Rochester, N. Y.

The Givaudanian. Industrial Aromatics Division, March, 1938, feature article: "Deodorized Paint"; also other valuable suggestions for users of industrial aromatics. Givaudan-Delawanna, Inc., 80 5th ave., N. Y. City.

Thermostatic Steam Traps. Folder, exclusive features and diagrammatic sketches of operation outlined; prices; specifications. C. J. Tagliabue Mfg. Co., Park & Nostrand aves., Brooklyn, N. Y.

Tungsten. March, 1938, a splendid and valuable resume of tungsten data, giving also charts on production, prices and imports, describing sources of deposits and output. American Tungsten Ass'n, 111 Sutter st., San Francisco, Calif.

Turbine Type Water Supply Systems. Bulletin 260-B13C, outlines design features and structural advantages of company's turbine pumps, also smaller and larger capacity units; tables for estimating water requirements, and pictorial presentation of various services of these water systems. Roots-Connersville Blower Corp., Connersville, Ind.

Two-stage Centrifugal Pumps. Bulletin No. 7067, on Cameron Class GT, complete specifications and operating characteristics. Ingersoll-Rand Co., Phillipsburg, N. J.

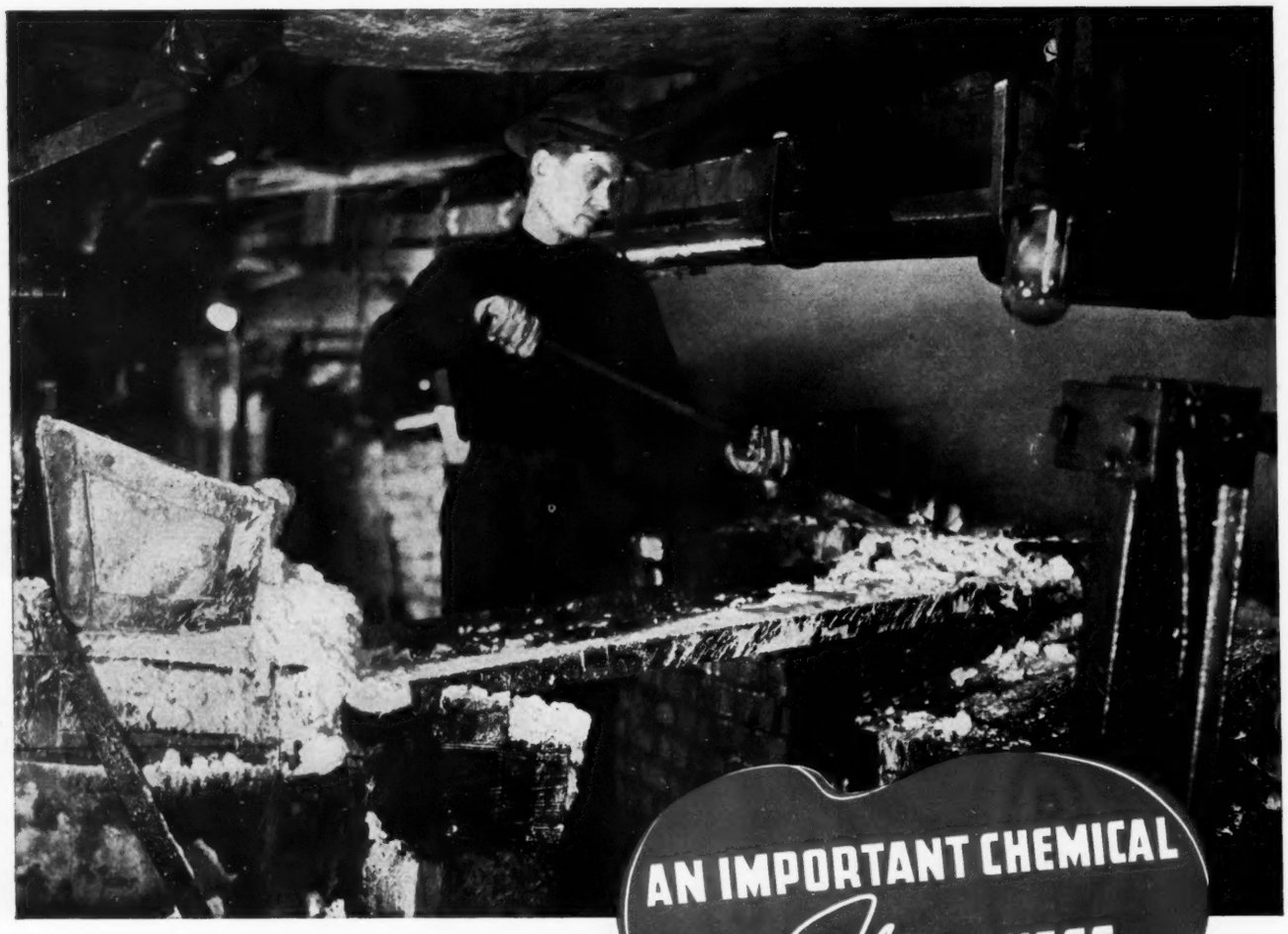
Wrought Iron for Piping Systems. Bulletin, engineering data on pipe materials; costs; pipe selection; why some metals resist corrosion better than others; water supply, drainage, heating and power systems; and section devoted to installation procedure. A. M. Byers Co.; Pittsburgh, Pa.

New Appointments

H. S. Strouse has been appointed vice president of the Harnischfeger Corp. of Milwaukee, which position he will combine with his activities as head of the Treasurer's Dept.

Douglas F. Miner, manager, Central Engineering Labs. and Standards of Westinghouse, has been appointed George Westinghouse Professor of Engineering at the Carnegie Institute of Technology. Professor Miner, who will assume his new duties September 1, will act as coordinator for the Westinghouse cooperative engineering plan under which a qualified group of engineering students at Carnegie Tech. will take the usual technical college course, and during the same period will receive shop and engineering experience at the Westinghouse plant.

The professorship is part of the plan announced last fall when the Westinghouse Company appropriated $200,000 to the endowment of Carnegie Tech. Another part of the plan provides ten scholarships annually for exceptional students who will receive from Westinghouse the sum of $3,000 over a five-year period required by the course.



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Chemical engineers have developed many entirely different uses for Zinc Chloride.

Among the many interesting applications of this chemical are its uses as a flux for metal, a purifying agent for petroleum, a weighting addition to silk, and an important wood preservative.

This year marks the 100th anniversary of the use of Zinc Chloride as a wood preservative. It is also a fitting coincidence that DU PONT Chromated Zinc Chloride, an *improved* wood preservative, is meeting with ready acceptance by engineers, architects and builders everywhere. This comparatively new chemical applied to lumber by pressure treatment offers longer service life outlasting 3 to 10 installations of untreated wood.

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Write for a copy of the new folder, "Stop Decay and Termite Damage."

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GRASSELLI CHEMICALS DEPARTMENT

Wilmington, Delaware

New Chemicals for Industry

A digest of products and processes

New Developments in Modern Textile Effects

By G. S. Ranshaw

IT is natural when considering new season's productions, so far as they relate to the work of the dyer, printer or finisher, to adopt newness or novelty as a criterion. Yet so many of the effects which are loosely termed "new" consist merely of old ideas and practices revived in a different guise or more developed form, that it is better to abandon the stricter classification and confine attention to developments in which some fact, process or idea, whether intrinsically new or not, is adapted specifically and with striking results to meet the particular trend of fashion at the moment.

The introduction of viscose staple fibre into the textile raw material economy has been attended by results no less striking than those which attended the commercial development of continuous filament rayon. A number of problems in connection with its use remain to be solved, however, not the least of these being concerned with its use alongside wool. Up till recently, for instance, it has often been difficult to obtain solid shades on fabrics composed of yarns consisting of wool and staple fibre, yet there is a large field in which such yarns could be used if solid shades fast to light and washing could be obtained easily and economically.

Dyeing Process for Wool-staple Fibre

A very recent process (I.C.I.) in which a special method of using the range of solubilized vat dyestuffs (Soledon colors) has been developed, aims at attaining this object. According to this process, the material is first padded with an aqueous solution of the dyestuff, followed by drying and steaming, the color being finally developed in an acid persulfate bath. The padding operation is conducted at 60° C. and the steaming at 100° C. Fixation on the wool and partial fixation on the staple fibre occurs during steaming; fixation on the staple fibre is completed during the development. The regulated addition of auxiliary products (1) to increase the solubility of the dyestuffs; (2) to assist wetting of the fabric; (3) to develop acid during the steaming process; and (4) to cause a slight swelling of the fibres, is provided for.

The ease and cheapness of applying the dyestuffs by this method removes one of the major difficulties in the development of thoroughly serviceable fabrics with new and attractive characteristics. These will mostly be in the brighter shades and destined for ladies' and children's wear. Another development, this time in finishing, enlarges the scope and utility of all types of staple fibre dresswear fabrics. This is the successful application of the two well-known shrinking processes to fibre. Results on the continuous filament viscose have been frankly disappointing, and the fully shrunk finish can at present be applied to only a few constructions, but even the popular lines in staple fibre have been successfully shrunk mechanically, with the result that the characteristics of the fabrics are strikingly enhanced. They print better, handle better, and display less tendency to crease and crush. These are facts of great importance for the successful exploitation of staple fibre in the dress-goods trade and form an element in its favor when competing with continuous filament.

A noteworthy feature of recent processing has been the increasing degree in which resort has been had to pre-creping, *i.e.*, the method of embossing patterns on crepe constructions in order primarily to pre-determine the type of pebble or crepe figure that will subsequently be produced in scouring and creping, and thus to promote uniformity. The use of this process has led to the production of some very interesting and serviceable cloths in the cheaper constructions, but the vogue for surface structure has led to its even wider development with a view to adding a distinct embossed pattern resembling the jacquard patterns, otherwise obtained with greater labor and expense.

One of the surprises in this connection has been the ease with which the recently introduced cuprammonium crepe fabrics can be pre-embossed and the relatively permanent effect obtained. The cuprammonium crepe yarns themselves are worthy of mention here, since they are being loomed without difficulty and are being finished to fabrics which are really distinctive in appearance and handle.

Turning to the work of the printer in producing the styles of the moment, comment must be made on the extent to which the vogue for screen-printed goods has developed in England, and the success which has attended the efforts of screen printers to adapt themselves to current requirements. Here we have virtually a development of stencil-printing with its advantages of economy in operation and variety of output, but without the severe limitations imposed on the type of design which can be laid down successfully. Screen-printing is admirably adapted to meet the needs of the moment where more emphasis is laid on novelty of design than on long runs, since the screen printer is able to tackle orders which it would be uneconomic to undertake by machine or block work. Not only are handkerchiefs, squares, bias scarves and other smallwares being screen-printed, but a successful eight-color design, incorporating a matt pattern effect, has recently had a good sale as a 36-in. dress material. The designs used in this country are usually the print-on type, but single-color discharge work has been tackled, as have vat prints, while as many as twenty-four screens have been used to produce one design for a furnishing fabric.

Stencil Printing

Mention has been made of stencil-printing. In one respect, at least, this method of obtaining a printed design has been given a new life. It was probably the Coronation influence which was responsible for the introduction of gold and silver effects combined with bright heraldic colors, and whereas these would formerly have been contained by the use of metallic pigments and been applied only to the more expensive dress silks, the existence of various new synthetic lacquers, many produced on a cellulose basis, naturally led the rayon manufacturers to consider their suitability for application to viscose and acetate fabrics. This was probably responsible for the emergence of the popular lacquer print which is most successfully produced by the use of the stencil and the spray-gun. Specially mixed cellulose lacquers are used and these are generally of the nitrocellulose variety where the ground is viscose rayon, but they

cannot be used with acetate since the solvent would affect the acetylcellulose of the fibres. There are, however, numerous ways of producing a lacquer effect from the acetate itself.

Matt printed effects have been prominent of late and are still being developed. There are numerous ways of producing these on acetate, one being to deposit zinc oxide by padding, such portions of the material as are desired to remain unaffected, *i.e.*, lustrous, being protected from the action of the pigment by a mechanical resist such as gum arabic. Dyestuffs of the "Duranol" type may be incorporated in the resist for colored effects if desired. Damask effects on viscose may be obtained by the use of white pigments as filling agents together with certain fixing agents specially developed. The well-known ciré effects are now being successfully produced by spraying on the fabric an aqueous emulsion of special synthetic waxes followed by partial drying, and hot calendering under pressure. Crepe satins are specially suitable for receiving these effects, and ciré patterns may be obtained by stencils. Abstracted from *The Chemical Age*, Jan. 8, '38, p. 29.

Plastics Replace Lead Seals

Plastics are being used in Germany as a substitute for imported lead for manufacturing seals for locking packages, measuring instruments, freight cars, etc., so that they may not be opened or tampered with, without detection. While possessing all of the advantages of lead seals, the new plastic seals are stated to offer an additional advantage in that they can be readily applied by hand without the use of any special fastening or locking tools. By simply pressing together the two parts of the plastic seal, the seal becomes locked and, like lead seals, cannot be opened without destroying the seal. American Consulate General, Frankfort-am-Main, states that a special plastic seal has been manufactured for electricity meters, the locking of which occurs in association with the screw-head.

Prevention Ice Formation on Airplanes

A method of preventing ice formation on airplanes involves use of colloidal metal paint through which an electrical current is passed. *Chemical Age*, Mar. 26, '38, p. 252, states that method is applicable not only to the leading edges of the wings, but also to propellers, control members, wireless aerials and other parts.

Wool-like Staple Fibre

Rayolana, a staple fibre, with dyeing affinity and properties exactly like those of wool, is announced by Courtaulds, Ltd. Reported in *Chemical Trade Journal*, Mar. 25, '38, p. 243.

Non-skid Flooring

Non-slip safety metal, highly resistant to rust and acid corrosion and unaffected in its non-slip properties by water, oil or other slippery liquid substances, is being manufactured by American Brake Shoe & Foundry Co. New product is marketed under the trade name of Non-Slip Absco Metal. It is extensively used for stair treads, ramps, industrial floors, platforms, elevator door sills, swing type door thresholds.

Solvents for Rubber Cements

Special naphthas for rubber cements, called Skellysolve, are special hydrocarbon fractions of uniform quality which have been developed by Skelly Oil Co. Covering a wide range of properties for different processing conditions, these solvents are produced in a number of grades. Advantages claimed are: low evaporation losses, close boiling ranges, quick drying, and absence of unsaturated compounds. In addition, they are odorless and tasteless, making them suited for cements to be used in the food industry. As they have no greasy residues to prevent complete drying, these cements when produced yield deposits of greater strength. Owing to the absence of extremely volatile compounds, products have a low vapor pressure, which is advantageous in cements used for warm climates.

Wool Test

A simple test for the detection of oxidation in wool has been discovered by Henry A. Rutherford and Milton Harris, research associates, American Ass'n Textile Chemists and Colorists, according to the Dept. of Commerce. Method is based on the ability of oxidized wool to convert a ferrous salt into a ferric salt which, in the presence of thiocyanate, gives the characteristic red color of ferric thiocyanate.

Razor Strop Composition

A patented composition for rubbing on razor strops consists of cocoa butter and aluminum powder. It is said to aid in giving a fine edge to a razor. *Aluminum News Letter*, March, '38.

Synthetic Tanning Agent

F-2-K, a new synthetic tanning agent, using phenol as the starting material, has been developed by the Ukrainian Research Institute, according to *Chemical Age*, Mar. 19, '38, p. 231.

Fur Dyeing Processes

New processes for dyeing furs of rabbits, pine martens, marmots and other small furred animals have been developed at Central Research Laboratory of the Fur Industry, with the aid of which it should be possible to dispense with imports of resorcinol and pyrogallol. *Chemical Age*, Mar. 19, '38, p. 231.

New Ferroalloy

An interesting new ferroalloy, known as Silvaz, is a deoxidizing alloy of silicon, aluminum, vanadium, and zirconium, correctly proportioned for use in production of clean steel with controlled grain size. Manufacturer is Electro Metallurgical Co., New York City.

Soluble Rayon Coning Oil

Laurel Ruxite RO, a soluble rayon coning oil, is announced by Laurel Soap Mfg. Co., Phila. It is described as a superior rayon lubricator which prevents split filaments and breaks; gives greater pliability; emulsifies readily in water; washes out entirely in scouring process; does not discolor on standing; increases winding efficiency.

New Use for Shellac

A new use for shellac is indicated by investigations carried out by the Indian Lac Research Institute of Namkum, and reported in *Chemical Trade Journal*, Mar. 25, '38, p. 250. The product obtained by the condensation of aleuritic acid, one of the major components of shellac, with phthalic anhydride and glycerine, has been found to be clear and flexible with good adhesive properties, rendering it applicable for use in the manufacture of laminated safety glass and also of plywood. It has also been found that the incorporation of maleic acid with shellac varnish under certain conditions yields coatings with improved gloss, water resistance, elasticity and adhesion to glass.

Resins for Airscrews

After extensive research a protective covering for wooden airscrews has been developed, to take the place of hitherto used linen fabrics. New covering consists of a fabric envelope treated with a special flexible synthetic resin of a rubbery nature that is pressed closely to the blades by a new hot-molding process. This method provides a tough layer of protective material, which is bonded very firmly all over the wood. Special reinforcement is incorporated in the covering along the leading edges, thus rendering metal sheaths superfluous. Material is unaffected by ultra-violet light, oils and gasoline, and is very resistant to moisture and general weather conditions, offering effective protection to the wood. *British Plastics*, Mar., '38, p. 527.

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SOLVENT NEWS

Reg. U. S. Pat. Off.

May ★ A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries ★ 1938

U.S.I. ENTERS RESIN FIELD

Acquires The Business Formerly Conducted By Robert Rauh, Inc.

Synthetic Resins — Phenolics, Alkyds, Ureas — and Ester Gums Are Recognized as Logical Additions to Present U.S.I. Line

As part of its general program of expansion in the chemical field, the U. S. Industrial Alcohol Co. as of May 1, 1938 took over the business formerly conducted by Robert Rauh, Inc., well-known manufacturer of synthetic resins.

Robert Rauh, Inc., occupied a large, modern plant at Newark, N. J., where it specialized in the manufacture of a diversified line of resins, including alkyds, phenolics, ureas, ester gum, and copal esters. Well equipped laboratories were maintained for development work on new resins and on new uses for these products. All these facilities will be continued and expanded under the new ownership.

Similar Outlets

Among the principal industries served by Robert Rauh were the paint, varnish, lacquer, printing ink, linoleum, adhesives, plastics, composition floor tile, and insulating materials fields. Because these outlets are substantially those now using solvents and chemicals of the type manufactured by U.S.I., it is obvious that resins form a logical addition to this line, and place the company in a better position to serve the needs of its trade.

Expansion of the Rauh company has kept continually abreast of growth of the synthetic resin field. While the company has occupied its present plant since 1930, its history goes back to 1849 when David Rauh founded the firm abroad to make brewer's pitch. About 1912 the business was transferred to this country and a plant was opened in Newark, N. J. With the advent of Prohibition the market for brewer's pitch was curtailed and

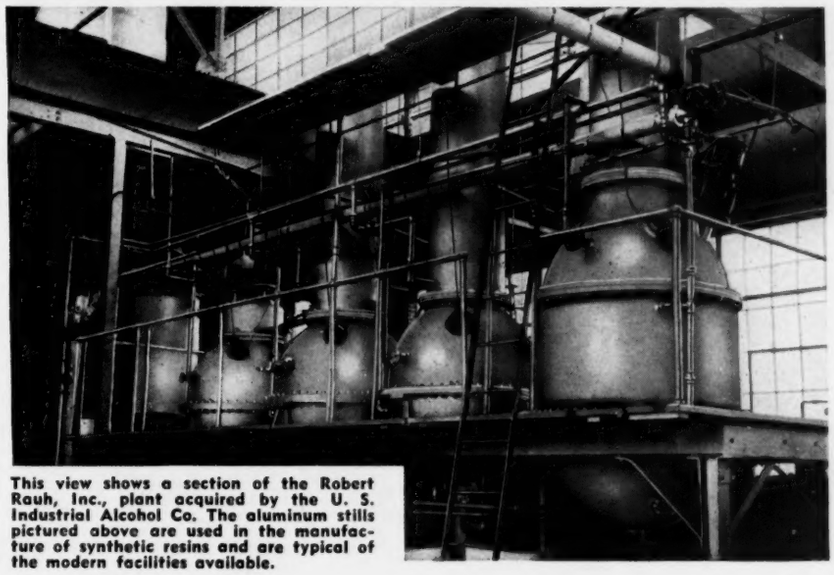
(Continued on next page)

Important Notice

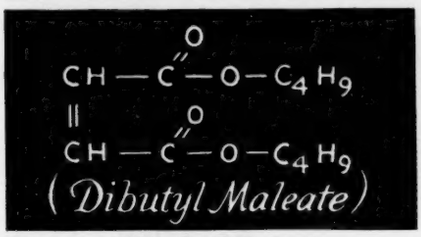
Restatement of Policy

The reputation of a company is based not only upon the quality of its products and the character of its services, but also upon the soundness of its policies.

Coincident with the announcement of its entrance into the synthetic resin field, it will be of interest to the paint and varnish industry as well as to the lacquer industry for U.S.I. to reiterate its intention to continue as a manufacturer of raw materials for the trade and to refrain from producing finished products in competition with its customers.



This view shows a section of the Robert Rauh, Inc., plant acquired by the U. S. Industrial Alcohol Co. The aluminum stills pictured above are used in the manufacture of synthetic resins and are typical of the modern facilities available.



Tests With Maleic Acid Esters Indicate Use In Synthesis

Dimethyl, Diethyl, Dibutyl Maleates Recently Introduced by U.S.I.

NEW YORK, N. Y.—Experiments indicate that three new U.S.I. products — Dimethyl Maleate, Diethyl Maleate and Dibutyl Maleate —may be of value both as solvents and as intermediates for chemical synthesis.

These maleic acid esters are now available in limited quantities from small scale operation. Samples may be secured for experimental investigation.

Acid Is Unsaturated

Possibilities for the three esters in the field spring from the fact that their maleic acid component is of an unsaturated nature. Because of the presence of a double bond, it can be inferred that the esters are capable of undergoing the reactions characteristic of other unsaturated compounds such as addition, reduction, oxidation and polymerization. It is known, in addition, that maleates, being optical isomers, go over into fumarates under certain conditions and vice versa.

Laboratory tests demonstrate that Dibutyl Maleate has interesting properties as a solvent. The most outstanding of these is its low vapor pressure, which indicates that it may have possibilities as a solvent-plasticizer. The boiling point of Dibutyl Maleate is 123° C. at 3 mm. absolute pressure.

Dimethyl Maleate and Diethyl Maleate are also high boiling solvents with respective distillation ranges of 198°–210° C. and 218°–230° C. at normal atmospheric pressure. Laboratory tests have shown that Dimethyl Maleate is an active solvent for cellulose acetate even when used with up to 50 per cent of ethyl alcohol, Solox* and the Ansols.*

*Registered trade marks of the U. S. Industrial Chemical Co., Inc.

High Wet-strength Paper

A water-absorbing paper product of high wet-strength can be produced by impregnating a highly porous paper body with a dilute solvent (acetone or ethyl acetate) solution of cellulose acetate, it is claimed in a patent recently issued. About 0.5-2.0% of the ester is used, based on the dry weight of the paper. The volatile organic solvent is removed and the cellulose acetate remains among the interstices of the paper, the patent states.

[Among the products mentioned above, U.S.I. manufactures acetone, and ethyl acetate.]

ADVERTISEMENT—*This entire page is a paid advertisement.*

MAY ★ SOLVENT NEWS ★ 1938

Devise Simple Test For Quality Of Castor Oil In Cotton Solutions

BALTIMORE, Md.—A simple qualitative test for distinguishing the quality of castor oil present in nitrocellulose solutions has grown out of observations by U.S.I. chemists that a black, sticky oil drips from burning films containing this substance.

In actual operation the test consists of preparing a strip (½" by 1") of test film from the solution under examination, igniting it and then noting the rate at which the black, sticky oil drips. This rate, previous experiments have shown, is always in direct proportion to the amount of castor oil present and in inverse proportion to its viscosity.

Neither dibutyl phthalate nor treated linseed oil exhibit this behavior, nor do they change the rate of drip if present in the same film with castor oil.

It is believed that this method may be applicable over a fairly wide range of conditions since tests with films of nitro-cellulose solutions formulated with seven different castor oils (raw, pale blown, and five processed grades) in amounts varying from 33% to 160% by weight of nitrocellulose yielded consistent results. The nitrocellulose used was an R.S. grade, 6, 8, 20 and 39 second viscosity.

Uses Medium Boilers In Quick-dry Printing Ink

NEW YORK, N. Y.—Use of a blend of medium-boiling lacquer solvents in the formulation of a quick-drying printing ink is described in a patent recently granted an inventor of this city. The ink is reported especially adapted for printing on non-absorbent material, such as the tinned plate used in the manufacture of cans.

The new ink is said to contain cellulose nitrate dissolved in a mixture of amyl acetate and diacetone alcohol, gum copal, ester gum dissolved in a mixture of butyl alcohol and butyl propionate, a non-volatile plasticizer, soft soap, coloring ingredient and magnesium carbonate.

[Among the products mentioned in the article above, U. S. I. manufactures amyl acetate, butyl alcohol, butyl propionate and plasticizers.]

Process Extracts Zein Suitable For Plastics

TERRE HAUTE, Ind. — By holding the temperature between 55°–60° C., and the final pH within the range of 6.0–7.0, it is possible to extract commercial quantities of zein, suitable for use in the production of plastics from maize proteins, according to an inventor here. Zein obtained by previous extraction processes has not been suitable for plastics, it is claimed in the patent.

A suitable process outlined in the patent comprises adding 93% ethyl alcohol to ground gluten meal, agitating gently during the extraction period, decanting, and repeating the process until the extraction is complete. The alcohol should be brought to a temperature such that after adding it to the meal, the resulting temperature is within the preferred range. Alkali may be added at the beginning or during the extraction to maintain the specified hydrogen ion concentration.

U.S.I. Enters Resin Field

(Continued from previous page)

the company concentrated on the manufacture of ester gums.

Following the war, expansion in the paint, varnish and lacquer industries created a demand for improved finishes, and ester gums soon became an important raw material for these new finishes.

A few years later, the Rauh company again expanded its facilities and began the manufacture of phenol-formaldehyde resins and copal esters. Subsequently, the company added a line of alkyd resins and urea resins and, since Repeal, has resumed the manufacture of a considerable volume of brewer's pitch for lining beer barrels, kegs and other brewer's equipment.

New Units Installed

In 1937, new units for the manufacture of phenolic and alkyd resins were installed to enable the company to meet the increased demands for resins of this type, and to keep pace with rapid developments in the field.

Major distribution of Rauh products has, until now, been in the East, although they are known in the midwest as well as on the Pacific Coast. Synthetic resins will be nationally distributed by U.S.I. sales offices in all leading cities.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A dispersion agent whose use, it is claimed, so facilitates the dispersion of carbon blacks that enamels with improved gloss and bluer tone can be produced, was introduced recently. The manufacturer also states that stronger tints and lower grinding costs are other advantages obtainable. **(No. 91)**

U S I

To illuminate the inside of barrels, drums, tanks, etc., a special stick-like flashlight is now on the market. The aluminum lamp is said to be safe in the vicinity of explosive fumes and dusts, and is easily manipulated. A mercury switch in the shank automatically turns off the light when not in use. **(No. 92)**

U S I

Fatty acid soaps unique in their oil solubility and in their ability to emulsify oil systems are said to be among the products which can be formed from a non-volatile tertiary amine recently introduced. The compound, described as amphoteric, also forms water soluble salts with inorganic acids, is a solvent for a wide variety of compounds, and is useful as an ingredient in paint removers as well as in certain syntheses, it is stated. **(No. 93)**

U S I

A new thermoplastic coating for the inside of containers is said to resist acids and alkalies, as well as water and some alcohols. According to a recent announcement, the coating is easy to apply, retains its protective characteristics almost indefinitely and is an effective moisture-proofing agent. **(No. 94)**

U S I

Standard quart cans can be used with siphon feed spray guns by means of a special cover, according to a recent report. The cover is said to lock in any position on the circumference of the container, protect against leakage, and permit the user to make rapid changes without cleaning standard containers. **(No. 95)**

U S I

Metal furniture putty, which can be applied to steel, aluminum and other metals, is now on the market. According to the manufacturer, it can be applied with a knife or, if thinned, by spraying or brushing. The putty air dries or bakes and, when hard, sands freely to a smooth surface, it is claimed. **(No. 96)**

U S I

Wide-range indicator papers that pass through five color changes in the range pH 2 to pH 10 are now supplied by one manufacturer. They can be used with turbid and highly colored solutions by observing color of outer diffusion zone on spot tests, he reports. **(No. 97)**

U S I

A new preservative and antioxidant is said to prevent both decomposition and polymerization of linseed oil when added in the proportion of 1:1000. The product is also effective with other vegetable oils, blood albumen and is soluble in most organic solvents and vegetable and mineral oils, according to the manufacturer. **(No. 98)**

U.S. INDUSTRIAL ALCOHOL CO.
U.S. INDUSTRIAL CHEMICAL CO., INC.

WORLD'S LARGEST PRODUCERS OF ALCOHOL DERIVED SOLVENTS

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AMYL ALCOHOLS
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Specially Denatured
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Absolute—Pure
C.P. 96%—Pure and Denatured
Pure (190 Proof)—Taxpaid, Tax Free

*SOLOX—The General Solvent
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95%, 97% and Pure
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AMYL ACETATES
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AMYL PROPIONATE
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ETHYL ACETOACETATE
SODIUM ETHYL OXALACETATE
PARACHLOR-O-NITRANILINE

ACETONE
DIBUTYL OXALATE
DIETHYL OXALATE
ETHYL CHLORCARBONATE
ETHYLENE
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POTASH BY-PRODUCTS

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Wetting, Dispersing Agents

One or more mol. of a hydrocarbon containing one or more double linkages and/or hydroxyl groups, *e.g.*, amylene, oleyl alcohol, etc., are sulfonated prior to, or during, condensation, with one or more mol. of a completely saturated cyclic hydrocarbon, *e.g.*, hexahydrobenzene, preferably in presence of a multivalent metal chloride catalyst, *e.g.*, aluminum chloride, and, if desired, an inert solvent, *e.g.*, carbon tetrachloride. Products are washing, wetting, emulsifying, lime soap dispersing, etc. agents. E. P. 468,956, described in *Abstracts*, Mar. '38, p. 127.

Tetralin Used First Time in U. S.

First successful use in America of tetralin in the internal treatment of gas mains, was reported by M. E. Shea, General Supt., Roanoke Gas Light Co., at the distribution conference of the American Gas Ass'n, last month. Technically, tetrahydro-naphthalene tetralin was used here to absorb naphthalene deposits from gas by direct atomization, as well as to dissolve accumulated deposits by condensation. It tends to reduce interruption of service as a result of stoppage of mains. Patent has been applied for process by Mr. Shea and du Pont.

Molding Compound

Molding Compound 2,274 is a new product of General Plastics, Inc., No. Tonawanda, N. Y., and was developed to meet the problem of molding parts with especially large inserts which are subject to extremes of temperature. While compound is comparable with standard compounds, the final set is slightly more flexible. Therefore cracking is avoided in the finished piece which otherwise occurs with expansion and contraction of the metal inserts. It is especially adaptable with terminal studs, brush holders, etc.

Abrasive Polishing Grains

EPT Lionite Polishing Grains, new abrasive for special applications, is announced by General Abrasive Co., Niagara Falls, N. Y. Product has been developed for special applications where little self-dressing of the wheel occurs, and where the abrasive must be depended upon to fracture clean and to continually present new surfaces to the work. EPT Lionite is sharp, cuts fast and will not glaze. It keeps on cutting fast and clean, right down to the canvas. Since glazing is eliminated, wheel life is lengthened.

New Plastic

Gelatex, a new plastic, is being manufactured at the glue and gelatine factory of Milligan and Higgins, Inc., Johnstown, N. Y. Product has been patented by Jean Monier, of England, and promises a wide diversity of uses. It can be drilled, sawed, or polished, is very strong and withstands heat and other tests. It has displayed remarkable possibilities from an economical standpoint.

Destruction Red Spider in Citrus Groves

A new addition to the range of Io-Dows is DN Dust, to be used for destroying the red spider menace in citrus groves. New insecticide, product of Dow Chemical, is made by combining Dinitro-ortho-cyclo-hexyl-phenol with walnut flour.

Container Coating

A thermoplastic material for coating the inside of containers is resistant to both acids and alkalies, as well as to water, some of the alcohols and many other products. Manufacturer, Dewey & Almy, Cambridge, Mass., states it is not proof against oils or against solvents of the acetone-benzol types. It is, however, an effective moisture-proofing agent. Coating is described as forming a coherent, cohesive film that protects the container from the chemical action of the contents. M. P. is given as 125°-160° F., depending on requirements for which it is made.

Makes Fabrics Water-repellent

Fibres, yarns, fabrics, etc., of cotton, jute, linen, hemp, artificial silk, and wool are rendered water-repellent by reaction, *i.e.*, impregnation followed by heating for a short time to a temperature above 100° C. with an aliphatic or naphthenic aldehyde having an alkyl radicle or naphthenic residue of at least 10 carbon atoms so as to produce surface etherification. Catalysts may be employed. Substances yielding aldehydes, *e.g.*, acetals, may also be used. The aldehyde may be applied by immersion or spraying, and may be added directly to a cellulose acetate spinning solution. In examples, (1) spun viscose rayon is treated with stearic aldehyde and heated to 150° C., (2) acetate silk taffeta is treated with behenic aldehyde and heated to 140° C., (3) cuprammonium artificial silk is treated with montanic aldehyde and heated to 160° C., (4) wool clothing is treated with stearic aldehyde and heated to 150° C., and (6) palmitic aldehyde is added to an acetyl cellulose spinning solution, and the spun yarn is heated to 140° C. E. P. 477,029 described in *Chemical Trade Journal*, Mar. 18, '38, p. 231.

New Sealer

Abopon, a clear, transparent, inorganic, non-inflammable odorless liquid, which can be diluted with water and applied by dipping, brushing, or spraying, is announced by Glyco Products Co., 148 Lafayette St., New York City. On drying, a transparent, colorless film is left on the surface which effectively seals the material. Thus, in general, only one or at the most two coats of the lacquer or other coatings are all that are required to give the desired effect. Product can be used in exactly the same way to prevent penetration of oils and greases into paper and similar products.

Bright Nickel Finish

A process whereby bright nickel can be secured from standard baths by means of certain addition agents is announced by Seymour Mfg. Co., Seymour, Conn. This process produces a brilliant plate of nickel which is soft and ductile, and requires a minimum of control, characterized by freedom from pitting and ease of operation. It may be deposited on steel, either directly or over copper plate, on brass or other non-ferrous alloys, and on zinc-base alloys which have been previously copper plated or dull nickel plated. No special preparation of the base metal is necessary other than a suitable high finish. This nickel is not passive and can be chromium plated without activation or color-buffing, and the nickel does not tarnish readily. Solution is stable, has good throwing power, and produces a bright plate at all thicknesses of deposit.

Conversion Coal into Crude Oil

A method for converting coal into crude oil has been effected by chemical engineers of the U. S. Bureau of Mines. Operation involves reduction of the finely divided coal by hydrogen at elevated temperatures and pressures. It was discovered in Germany by Dr. F. Bergius in 1915 and is being carried on industrially in Germany and Great Britain. To determine the amenability of American coals to such a treatment, a small experimental plant was erected by the Bureau of Mines at Pittsburgh. Plant includes a unit for catalytic production of hydrogen from natural gas. This hydrogen and a mixture of equal parts of the coal and a heavy oil are pumped into a reaction vessel at a pressure of about 3,000 lbs. per sq. in. and a temperature of about 450° C. (842° F.). A small amount of tin sulfide is mixed with the coal to serve as a catalyst for the liquefaction. After about two hours approximately 75 per cent. of the coal is converted into a heavy oil similar to petroleum and 25 per cent. into gaseous hydrocarbons such as methane, ethane, propane and butane. The high rank bituminous coal used is readily converted into oil. Further studies will examine the behavior of bituminous coals of lower rank, subbituminous coals and lignites.

Detergent Compositions

Liquid or semi-liquid washing agents of the polyglycol or polyglycerol ether type, obtained by condensing ethylene oxide, glycerol, etc., with fatty acids, fatty alcohols, fats, waxes, etc., are mixed with calcined salts possessing high adsorbent properties. Suitable adsorbents are derived from alkali metal salts of mineral acids which, on calcination, evolve a gaseous phase, e.g., water, carbon dioxide, etc. Calcination may take place after mixing if desired. E. P. 469,334, referred to in *Society of Dyers & Colourists Abstracts*, Apr., '38, p. 127.

Silk and Glass Tooth Paste Tubes

A collapsible tube for tooth paste, etc., made of glass and silk has been put on the market by Harnickell & Muller, Hamburg 1, Germany. It consists of ingeniously combining artificial silk and cellon glass by a new method so that an integral substance is formed. This is treated as would be aluminum or any other metal to make a collapsible tube. New tube is very light in weight, absolutely waterproof, and untearable.

New Sulfur Process

Plans have been announced by the Aldermac Copper Corp., Ltd., at Rouyn, Quebec, for construction of a sulfur plant, working on a method of treating pyrites with chlorine, technical details of which have not been released officially.

Colored Bricks

The problem of supplying the building industries with bricks, tiles, cements, etc., of shades more attractive than their natural ones, has taken a long step forward in a new method which has been patented by a British firm and described in *Chemical Trade Journal*, Apr. 8, '38, p. 282. The bricks are sprayed with the coloring agent, which may be any suitable oxide mixed with water, tar or other fluid, and then dusted with a protective layer of combustible material such as sawdust. This protective layer both assists in drying off the coloring agent and prevents the bricks from sticking together during the subsequent stacking and firing operations. The process is said to be particularly applicable to the coloration of bricks the faces of which have been treated to roughening mechanisms, and to enable the production, by mechanical methods, of products equal in color tones to those of hand-made facing bricks.

Rubber from Tung Oil

A rubber substitute which stretches, snaps back and in many respects resembles and behaves like natural rubber can be made from tung, soya bean and other vegetable oils, according to U. S. P. 2,111,427 granted to Harvey G. Kittredge, Dayton, O.

It is said to have many features which make it superior to the natural product. Many acids and alkalis do not affect it. Oil and greases do not attack it.

As a substitute for natural rubber in paints, and varnishes and as a coating for textile material, it is finding widespread use. It can be vulcanized like natural rubber with sulfur, yet the vulcanized product contains no free sulfur, which is considered objectionable in rubber for certain uses.

New rubber is made by heating a mixture of tung oil and glycerine to about 410 to 450° F. until complete reaction takes place. No milling is required. Besides tung and soya-bean oil as the starting material, oiticica, perilla and cottonseed oil may be used. Its use for auto tires is not mentioned in patent, but it may be mixed with natural rubber. From the *New York Times*.

Roof Cement and Coating

A new type of roof cement or roof coating, known as Rooflex, for which the manufacturer, Flexrock Co., 800 No. Delaware Ave., Phila., Pa., claims many advantages, is now available. Rooflex forms a seamless coat over the roof and permanently seals leaks. It will penetrate old felt paper and other roofing materials, and put new life into them. Because of its high melting point it will not run in summer, and its low cold test makes it ideal for winter service. Material is said to be very economical, affords long service, and is of the highest quality. It is made by combining Gilsonite, mineral asphalt, castor and Chinawood oils, and long Canadian Grade A asbestos fibres.

Unusual Iron Dioxide Pigment

An unusual iron dioxide pigment is being used in Sweden. It is made by calcinating a bog ore from the southern section of that country, which contains 94.8 per cent. Fe_2O_3, and over 4 per cent. silica. The material has slight traces of alumina, calcium oxide and sulfate compounds. The unusual factor of this new pigment lies in the fact that it is possible to grind it so fine that it will leave only a 2 per cent. residue on a 14,000 mesh screen. It has such a high tinting strength that only one third the quantity is necessary to match the color of a cheaper iron oxide product. From the *National Paint Bulletin*, Apr. '38, p. 18.

Industrial Finish

An industrial finish said to attain the production speed of lacquers and to possess qualities of permanence and durability common to synthetic resin finishes, is being made by Ault & Wiborg, New York City. Known as Pulymerin, new product is result of a distinctive formulation. Its action is due to the principle of polymerization, a chemical reaction whereby molecules combine under suitable conditions to form molecules of more complex and stable structure. The finish is suitable for washing machines, office equipment, metal furniture, toys, stoves, hospital equipment, plant machinery, and metal products.

Silver Lined Cans

A relatively inexpensive form of solderless, silver-lined container suitable for the shipment and storage of foodstuffs, chemicals, etc., has been developed by the Bureau of Standards and a manufacturer of cans in a research project directed toward new industrial uses of silver (*Manufacturers Record*, May, '38).

So far, 12 oz. containers have been produced from silver clad copper and steel sheets, the base metal being twelve thousandths of an inch thick with a silver coating one thousandth of an inch thick. The development of larger sizes is now in progress. Because of the germicidal and non-corrosive and other unusual properties of silver, development promises to be important.

Possible New Vegetable Oil

A new vegetable oil is being investigated in Germany according to *National Paint Bulletin*, Apr. '38, p. 19. It is known as Onguekoa Gore Oil, and has an iodine number of 184. Contrary to the opinion of Steger and Van Loon, the oil does not contain a new fatty acid with one bond and one triple bond. The existence of an octadecatetraenoic acid is suspected, but awaits confirmation by analytical tests.

Blood System Models from Resins

Corrosion specimens showing distribution of blood vessels in the body organisms, are prepared by a more rapid method made possible by the unusual chemical-resistant properties of Vinylite resins, according to results of recent research by J. E. Narat, J. A. Loef, and M. Narat of Chicago, Ill. The extreme chemical stability of these resins offers for the first time the opportunity of using acid-fast dyes to multi-color specimens with red arteries, blue veins, yellow ureters, and green biliary ducts. The resin solution is injected into veins, arteries, and other ducts and is allowed to solidify. Specimen is then immersed in 38 per cent. fuming hydrochloric acid for about 3 days, which disintegrates the tissue completely but does not attack the acid-resistant resin. An exact, accurate reproduction of the actual arrangement of the system is thus preserved as a plastic model for future demonstration, study, or diagnosis. Because these resins possess low moisture absorption, the specimens or models will not warp, bend, or crack, but will retain their shape permanently. News Edition, *Industrial & Engineering Chemistry*, Apr. 20, '38.

Acetate Plastics

A line of high quality acetate molding materials is being made by Bakelite. These acetates are thermoplastic molding compounds with a cellulose acetate base and are recommended for both injection and compression molding. They are manufactured in granular form in a wide range of colors, including crystal clear, black and variegated mottles, and are also available in transparent, translucent and opaque colors. Being custom-made materials, molding properties and finished material properties can be altered to suit specific applications. Molded pieces have a lustrous finish. They are warm and pleasing to the touch. These molded parts have unusual strength properties, being especially resistant to impact. Materials are suitable for an infinite variety of uses, restricted only by the effect of heat and certain solvents.

The following data are applicable to the normal commercial range of Bakelite acetate molding materials:

Physical (Molded)

Sp. Gr.	1.27-1.50
Impact Strength, energy to break test piece	0.4-1.8 ft. lbs.
Tensile Strength	3,000-6,500 lbs. per sq. in.
Transverse Strength	6,000-7,000 lbs. per sq. in.
Molding Shrinkage	.00025-.008 in. per in.
Heat Distortion	120-195°F.
Softening Point	180-250°F.
Hardness, Rockwell	80-120
Refractive Index	1.47-1.51
Light Transmission (Crystal)	80-90%

Chemical Resistance (Molded)

Water Absorption, 96 hours at room temperature	1.5-3.0%
Solvents: Soluble in ketones and esters, such as acetone, ethyl acetate, Cellosolve; Affected slightly by alcohol. Insoluble in hydrocarbons, such as benzine, toluene, styrene, carbon tetrachloride, oils.	
Elevated temperatures influence the action of both solvents and non-solvents inducing swelling.	
Dilute Acids and Alkalies	slight effect
Concentrated Acids and Alkalies	decomposes

Electrical (Molded) (A.S.T.M. Procedure)

Unchanged Resistivity ..... $1 \times 10^6 - 10^8$ megohm centimeters

	60 *cycles*	1000 *cycles*	10^6 *cycles*
Power Factor	.01–.04	.020–.060	.035–.060
Dielectric Constant	4.9–6.2	4.5–6.0	4.0–5.0
Loss Factor	0.05–0.25	0.17–36	0.14–0.30

Cleansing Agents

Solid cleansing agents which may be used in hard water without the formation of insoluble earth silicates are mentioned in E. P. 474,518, and consist of an alkali metal silicate, *e.g.*, sodium metasilicate $\alpha : \alpha' : \alpha''$—tricarboxylate. Society Colourists & Dyers, *Abstracts*, Mar., '38, p. 127.

White Plate

A new ternary alloy plate called "Spekwite" is announced by Special Chemicals Corp., 30 Irving Pl., New York City.

Coal Process

Production of standardized high-grade coal from virtually any grade of material from run-of-mine coal to refuse is now possible by means of the Sink-and-Float process, so-called after the physical principle upon which it is based. Use of recently available heavy liquid compounds—halogenated hydrocarbons—as, for example, pentachlorethane and tetrabromethane, the latter being 3 times as heavy as water, together with the pretreatment with an active agent solution which places a water film around the particles of coal and slate, have rendered the process commercially feasible.

The heavy liquids used in the process do not change in specific gravity while in use so that the quality of coal produced in any breaker or cleaning plant is not dependent on the human element. Moreover, as these liquids do not mix with water and a film of an aqueous solution of active agent consisting of tannic acid or starch acetate is placed on the particles before separation, the heavy liquids can be recovered from the coal and slate by sprays of water and reused. Thus, the loss of heavy liquid is very low and the process inexpensive to operate.

Developed by the Minerals Separation Division, R. & H. Chemicals Dept., du Pont, the company's engineers say that the new process should put the coal industry, particularly the anthracite producers, in a better competitive position, since the product would not only be considerably improved and standardized, but operating economies should result. The following specific improvements in quality are claimed: A more uniform product; complete elimination of slate; a reduction in ash and in ash-pit loss of fuel; elimination of clinker troubles; an increase in heating value per ton of fuel; more even combustion; easier control of combustion; less dust and dirt in fuel; less odors from gas and smoke. Another advantage is the reduction of sulfur fumes which harm vegetation and are damaging to property.

Month's New Dyes

The following dyes have been added to the General Dyestuff range: Celliton Fast Scarlet RN, for acetate rayon, surpasses their older Celliton Fast Scarlet R in fastness to light, perspiration, neutral and acid cross-dyeing, but is practically identical with it in shade and strength. It is suitable for production of yellowish shades of scarlet. Rapidogen Brown IRRN, an improved brand of Rapidogen Brown IRR, is not only more easily soluble than the old brand, but develops more rapidly in acid steam. It gives fine brown prints on cotton and rayon. Diazo Brilliant Orange 6G Extra, a diazotizing dyestuff, produces a bright reddish orange when diazotized and developed with Developer A, and a bright golden yellow with Developer ZA. It can be supplied sufficiently free from copper and manganese for vulcanizing styles.

A water-soluble dyestuff for acetate rayon, recently introduced by Imperial Chemical Industries, is Solacet Fast Red 5BGS, said to be of particular interest for dyeing of heavy crêpe and material of similar texture where good penetration is highly desirable. Company has a new red shade of Prussian blue, under the name "Prussian Blue 20044," which is said to be redder and stronger than the normal type pigment and to be suitable for use in printing inks, oil paints, synthetic varnishes and cellulose lacquers.

New du Pont dyestuffs include: Sulfanthrene Scarlet 2BN Paste, a vat color primarily of interest for printing delustered rayon. It is useful where bluer scarlets are desired and should find further use in printing bright rayon, acetate fibre, and cotton materials.

Two new du Pont dyestuffs for use in coloring printing inks are: "Lithosol" Yellow G Concentrated, similar in shade to "Lithosol" Fast Yellow HN Powder, but darker in masstone. Product is non-bleeding in water, shows only a slight bleeding in oil and alcohol and has demonstrated satisfactory light fastness. It has an exceptionally high tinctorial value and is expected to prove of interest where economy is a factor.

"Monastral" Fast Blue GS is very close in shade to peacock blue, and is greener than "Monastral" Fast Blue BSN. Like the latter type, new color has shown fastness to light, acids, alkalies, and lime, and does not bleed in oil, water, or alcohol. Because of the greenness of shade, it is expected to be useful for fast greenish blues and in combination for bright greens.

Four new vat colors are announced by J. R. Geigy. They are Tinon Chlorine Brilliant Greens 2B supra, BF supra, 2G supra and 4G supra, all fine powders for dyeing. These dyestuffs are stated to have high general fastness properties, with outstanding brightness and clearness of shade.

Chemical Specialties for Industry

A digest of new uses and new compounds

Ethylene Imine

Little Known Synthetic Organic Opens New Fields in Rayon Fabrics and Textile Specialties

By J. Wakelin

LITTLE direct information is as yet available about the properties of the imines, except that they are liquids and very reactive chemically. Ethylene imine boils at 55 deg. C. and is soluble in water.

The formula, $CH_2.CH_2=NH$, indicates that the substance is obtainable, at least theoretically, by the removal of a molecule of water from ethanolamine: $HO.CH_2.CH_2.NH_2$, and this is the basis of one patented method of manufacture. Other modes of preparation include the treatment of brom-ethylamine with silver oxide or caustic potash. According to Brit. Pat. 460,888 to Coutts & Co., and F. Johnson, representing the I. G. Farbenindustrie A-G, imines are made by treating the sulfuric esters of 1:2 or 1:3 alkylol-amines or their substitution products, with alkaline reagents, such as a solution of caustic alkali or alkaline earth in water or an organic solvent. A temperature of 50 to 200 deg. C. is said to be suitable and the imines so formed are recovered by distillation, preferably in an inert atmosphere.

For instance, ethanolamine sulfuric ester yields ethylene imine, N-methyl-ethanolamine sulfuric ester yields N-methyl-ethylene amine, and so on.

The chemical properties of ethylene imine seem to be somewhat akin to those of ethylene oxide; both form addition products by rupture of the ring system, except that the imine gives an amine whereas ethylene oxide gives an ether or a glycol compound. The reactions of these bodies with sodium bisulfite is interesting. Ethylene oxide combines with the above to give sodium isethionate, $HO.CH_2.CH_2.SO_3Na$, whereas ethylene imine gives taurine: $NH_2.CH_2.CH_2.SO_3Na$. The synthetical possibilities will be seen to be considerable; ethylene imine forms bases with a variety of other compounds.

An interesting proposal of the I. G. Farbenindustrie A-G, in Brit. Pat. 470,440, relates to the use of polymerized imines for recovering or removing weak acid constituents from gases, e.g., carbon dioxide, sulfur dioxide, and so forth.

The polymerization of imines is very simply brought about by allowing aqueous solutions to stand for 12 hours in contact with small amounts of sulfuric or hydrochloric acids. These polymers have other uses besides the above, being suitable as levelling agents in dyeing, as additions to rubber, for the preparation of mixed polymerization compounds with acrylic acid, and for improving the fastness of dyeings. They are stated to be colorless and viscous to waxy in appearance.

To judge from the number of patents published, the most useful and profitable outlet for imines would appear to be as a modifying agent for rayon. Apparently the imine combines with the cellulose substance to give a basic, amine derivative which is consequently more capable of taking up acid dyes than the original. Exactly what kind of reaction does take place is either not known or is not disclosed, and the above suggestion is at the most only a tentative theory. Thus, 55 grams of viscose staple fiber treated in an evacuated autoclave and then subjected to 10 c.c.s of ethylene imine in vapor form at 100 deg. C., is the principle of one patent. The material is then washed with water, then with dilute sulfuric acid, and again with water, when as a result its affinity for being dyed with wool dyestuffs is improved.

While one advantage of endowing cellulosic material with an affinity for wool dyes which are easy of application may be an advantage which is clearly appreciated, a further value of such a process is that mixed fabrics containing both wool and rayon may be dyed with much greater ease, and such fabrics are in popular favor today.

As an alternative to treating rayon fibers with imine, after the formation of the same, is the idea of incorporating the base in the solution to be spun prior to the spinning itself. Thus the imine becomes intimately incorporated in the material. Polymerized imines may be applied thus in the manufacture of rayon by the cuprammonium, viscose and acetate processes, when the resultant filaments are more susceptible to acid dyes.

Man's attempt to imitate the natural product wool is only partially successful in the foregoing discoveries; the modified rayon is made to acquire nitrogen which was not formerly present, but otherwise the resemblance was not very complete. The recent patent, E. P. 476,431, is significant for at least two reasons. Rayon is made "animal" by only a very slight alteration of the existing method of manufacture, as distinct from the many proposed methods which are elaborate and expensive. And again, the final product contains both nitrogen and sulfur, making the similarity to wool rather more close.

A solution of viscose containing 25 xanthate groups per 100 C_6 molecules of cellulose is spun in the known manner into an acid sulfate bath to product filaments. After washing in Glauber's salt, the threads are conveyed in the wet condition into a chamber where for a few seconds they are treated with ethylene imine vapor at 50 to 60 deg. C. They are washed, soaped and dried.

The prepared material contains about 1 per cent. of nitrogen and some sulfur. It may be dyed like wool with acid dyes to give shades of the same degree of fastness. The tensile strength of the new product is not affected by the process.

Rayon Changed to Wool

Cuprammonium rayon or "copper silk" filaments can be carefully dehydrated by alcohol, which changes the feel of these filaments to that approaching wool, according to recent German patent. Patentees use a series of baths containing alcohol of increasing concentrations from 30-95 per cent. The filaments are passed through baths in succession after spinning. The action of the alcohol extracts the water gradually. When the filaments are finally dried they look like fine wool fibers, it is claimed. *Rayon Textile Monthly*, Apr., '38, p. 74.

Detergent and Oxidizing Agent

"Ondal," new textile assistant is designed to serve both as a detergent and oxidizing agent in developing vat colors. Product is said to be quite stable, releasing its oxygen at a uniform rate. Advantages claimed for this new assistant are a decrease in the length of finishing time and number of operations required, and the assurance of easily duplicated shades. Manufacturer is du Pont.

An Economical Thermoplastic Resin

A modern synthetic resin, manufactured on an entirely new principle in the modification of materials obtained from the by-product coking of bituminous coal, is being made by The Neville Co., Pittsburgh, Pa.

The general physical properties of Neville 465 Resin are similar to those of the Neville Coumarone-Indene Resins, but the chemical properties are entirely different. In general, the compatibility is the same as coumarone resins.

It is of interest to the varnish industry in that it retards the gelation of Chinawood oil to a far greater extent than coumarone resin. When properly cooked into varnishes, these may be thinned 100 per cent. with low-priced petroleum naphthas.

It is suggested for use in the following:

Printing Inks	Linoleum
Paper Impregnation	Varnishes
Adhesives	Enamels
Mastic Floor Tile	Japans
Sealing Compounds	Foundry Core Binders
Caulking Compounds	Rubber Compounding

Average Properties

M. P.	110-125° C. (Cube-in-Mercury Method)
Color	12-16 (Dark Brown)
Odor	Strong, Characteristic
Ash Content	12-15%
Acid Number	0
Alkalinity	0.05 Normal
Sp. Gr. (77° F.)	1.20
Type	Permanently Thermoplastic
Appearance	Glossy, Dark Solid
Fracture	Conchoidal
Thermal Properties	Melts to a Low Viscosity Liquid without Frothing
Form	Solid

This resin affords as good protection against water and dilute acids as wood rosin, and is superior to rosin in alkali resistance.

Completely Soluble In:

Benzol
Toluol
Xylol
2-50-W Hi-Flash Naphtha
Tar Oils
Butyl Acetate
Creosote Oil
Turpentine
Drying Oils
Neville Heavy Oils
Ketones
50/50 Coal-Tar and Petroleum Solvents
Aromatic Hydrocarbons
Esters
Chlorinated Solvents
Ethers

Partially Soluble In:

V. M. & P. Naphtha
Mineral Spirits
Stoddard Naphtha
Gasoline
Alcohols

Insoluble In:

Water
Polyalcohols
Brine

Compatible With:

Asphalt	Rubber Hydrochloride
Tar	Ester Gum
Pitch	Rosin
Gilsonite	Ethyl Cellulose
Coumarone-Indene Resins	Most Synthetic and Natural Resins

Varnish Making Technique

Conventional Method not Correct: If 465 Resin and any drying oil (fish, tung, linseed, etc.) are heated together, an uncontrollable foaming occurs above 260° C. (500° F.) which obviously eliminates bodying oil in presence of 465 Resin above that temperature.

Proper Modified Method: If, however, the drying oils are carried to 575° F. and held there the desired length of time, they may be checked with 465 Resin, safely and without foaming. The addition of this resin cools the batch below 500° F. at which temperature the batch may safely be bodied without danger of foaming.

Addition of Driers: If the driers are introduced into the batch and cooked with it (such as is done with litharge or soaps of resin acids), the metal and resin react. This reaction prohibits the metal from acting as a catalyst for the drying of the oils; thus the purpose for which the metals are added is defeated. Instead, it is recommended that liquid driers be added to the batch *at the end* of the thinning operation.

Thinning: Although the resin itself is not completely soluble in petroleum thinners, its reactivity is such that during the cooking it is modified so that the batch is completely soluble in low-solvent strength petroleum thinners (such as Stoddard Naphtha). A properly cooked varnish containing 465 Resin shows no tendency to throw out resin at low atmospheric temperatures, when thinned with petroleum thinners.

Drier Content: It has been observed that the drier content of varnishes made with this resin must be somewhat higher than with coumarone-indene resin varnishes. The drier content will vary from 0.4 per cent. to 1 per cent. metal on basis of the oil content.

Type Formulae

A. Short Oil Length

100 lbs.	Neville 465 Resin
10 gals.	Tung Oil
4 gals.	3-hr. bodied Fish Oil
25 gals.	Stoddard Naphtha
4 lbs.	Lead Nuodex (24% metal)
4 lbs.	Manganese Nuodex (6% metal)

Cooking Procedure: Both oils are carried to 575° F. in ½ hour. 465 Resin is immediately added, stirred, and the batch bodied to soft pill at 500° F. Cool and thin. Add driers at 200° F.

Film Characteristics:

Set to touch	½ hour
Dust free	2 hours
Print free	5½ hours
Viscosity	Gardner-Holdt "E"
Gas-check	Negative
Color	Clear, brown—no insoluble matter

B. Medium Oil Length

100 lbs.	Neville 465 Resin
20 gals.	Tung Oil
5 gals.	3-hr. bodied Fish Oil
4 gals.	1-hr. bodied Linseed Oil
40 gals.	Stoddard Naphtha
5 lbs.	Lead Nuodex (24% metal)
5 lbs.	Manganese Nuodex (6% metal)

Cooking Procedure: Identical as given under "A. Short Oil Length."

Film Characteristics:

Set to touch	1 hour
Dust free	2½ hours
Print free	5 hours
Viscosity	Gardner-Holdt "G"
Gas-check	Negative
Color	Clear, light brown—no insoluble matter

Pigmentation: Enamels are easily prepared from 465 Resin varnishes by simple grinding of the pigment in the vehicle. All colors are possible even to a flat white coat.

Glass Insulating Tapes

Electrical insulating tapes, woven entirely from glass yarns, have been developed by Corning Glass Works, Corning, N. Y. These tapes, with the appearance and flexibility of ordinary textiles, are intended for the insulation of coils for motors, generators, transformers, and for cables and other electrical conductors. Being composed solely of glass, they not only have exceptional electrical properties and chemical resistance, but have the ability to withstand temperatures far in excess of the limits specified for class B High Temperature Insulation. They impregnate readily with resins, gums, and varnishes to form an insulation impervious to moisture and of high dielectric strength. Their flexibility and textile properties are obtained from the extreme fineness of the glass fibers, which is from 1/15 to 1/20 the diameter of a human hair.

Mildew-proof Mill White Paint

A mildew-proof mill white paint, said to contain a special non-yellowing fungicide which effectively kills parasitic spores on the painted surface, is being made by Billings-Chapin Co., Cleveland, O. The fungicide content, likewise, is said to blend smoothly with the oils and oxides without affecting the brushing characteristics or the smoothness of the finished film. In addition, it is claimed that the light reflectivity and color life of the paint is not impaired by the presence of the fungicide. Paint is recommended for use under conditions of high humidity and high temperatures.

Industrial Finishing Material

An enamel for industrial finishing which greatly speeds up production is announced by du Pont. Its shorter baking time (8 to 10 minutes at 350°) allows a greater output with smaller ovens. In addition to its shorter baking time, product has demonstrated satisfactory adhesion to metal and good hiding in one coat. It may be applied on solvent cleaned steel, bonderited steel or primed steel, and shows hardness, mar resistance, flexibility and high resistance to grease, soap and alkali. White or colors are available. It is known as Short-Bake "Dulux."

Waterproofing Compound

A waterproofing preparation (Persistol) for textiles has been developed by I. G., and is said to be similar to "Velan," produced by I.C.I. It is reported to be a great improvement over "Ramasit" and "Impraegnol," which it is largely replacing because it stands up better under washing and dry-cleaning. New preparation is more expensive than previously used waterproofings and its use is consequently confined to better grade fabrics. (Office of the American Commercial Attache, Berlin).

New Cellulose Wool

A rayon staple fibre which has created much interest in German wool circles is being made by Vereinigte Glanstoff Fabriken and described in *Kunstseide*. Floxalan is the name of this new cellulose wool, which is produced by the viscose process. Through special handling in the spinning process the surface is wrinkled and scarred, like the skin of reptiles, which run in all directions and form little regular and irregular moles, indentations, scallops or scales, very similar to wool. In addition to that the new staple fiber is crimped. The advantages of this new fiber are that this surface is brought about without any addition to the viscose spinning solution and without affecting its tensile strength. It increases adhesive qualities of the fiber three-fold, which permits soft twisted and voluminous yarns. It also exhibits unusual resistance to compression and crushing, which are of considerable value in dress goods, carpets, etc. It has excellent dyeing qualities, absorbs less dye compared with the regular viscose rayon staple fiber and is made in 3 and 3.75 denier sizes.

Silk Soaking Oils

Two oils used in silk soaking, and a new powder which combines alkaline salts and mildew preventive also used in silk soaking formulae, are being made by E. F. Houghton & Co., Phila. Silklubric No. 60 is a balanced blend of sulfonated animal and vegetable oils to which has been added a non-oxidizing white mineral oil and a wetting-out agent. It is used for soaking prior to direct knitting. It offers advantages of more surface lubrication, faster wetting-out, more uniformly conditioned tram and cleaner running silk. Silklubric "C" differs from No. 60 in that it does not contain any mineral oil. Silklubric Soaking Powder is a unit product, containing the proper proportions of alkaline salt and mildew preventive. Its use makes it necessary to use only two ingredients in the soaking bath: the oil and the powder.

Metal Office Equipment Finish

A specialty finish for office furniture, business machines, etc., for which many unique features are claimed is called "S-W Satin-Glo." It is offered in two spraying and two dipping qualities to meet requirements of this trade. Manufacturer, Sherwin-Williams Co., Cleveland, claims it produces a finish of pronounced beauty, lustre and mar-resistance in one coat. It is also resistant to severe abrasion, perspiration, chemicals and cleaning soaps. Satin-Glo is built around a chemically evolved vehicle developed to produce the toughest known finish when baked.

Upholstery Shampoo

For the quick removal of grease, oil, and perspiration stains from furniture upholstery, C. M. Cobb, 50 Congress St., Boston, announces a new shampoo, trade-marked Calpro.

Wide Range Test Paper

Hydrion wide range test paper for rapid determination of approximating PH, distributed by R. P. Cargille, 118 Liberty St., New York City, gives five distinct color changes in the range PH_2 to PH_{10}, and it is believed that this is the first time such a test paper has been made commercially available. It can be used with turbid and highly colored solutions by observing color of outer diffusion zone on spot tests, and is recommended for biochemistry, process control, product testing, and analytical procedures.

Improved Blueprint Papers

Improved blueprint papers, named "Series Sixty," said to produce prints of an unusually deep blue color, so that the white lines of the reproductions stand out in sharp, legible contrast, are being made by Keuffel & Esser, Hoboken, N. J. This extra color strength gives blueprints a high contrast ratio, making them as legible as original drawings.

An exceptionally wide printing range is also claimed. Tracings of varying transparency can be printed successfully at a single setting of the machine—or strong blueprints can be made from any tracing within a broad range of machine speeds. This extra margin of printing range reduces the danger of over exposure and under exposure, eliminates the necessity for "trial prints" and greatly speeds production.

Sulfamic Acid as Flameproofing Material

Flameproofing of fabrics, paper, and other combustible materials on a large scale is now an industrial possibility through discovery of a new process by which sulfamic acid can be readily prepared from urea and fuming sulfuric acid. In this process, developed by the du Pont Co., urea is first dissolved in excess cold sulfuric acid. Oleum of suitable sulfur trioxide strength is then added, and the reaction is allowed to proceed under controlled conditions. During the reaction CO_2 is evolved and the sulfamic acid formed precipitates from the solution. Product is isolated by filtration and purified by recrystallization from water. Since the reagents used in the process are available in unlimited quantities, it is now possible to produce sulfamic acid as a new industrial raw material.

The salt ammonium sulfamate is unique among orthodox flame-proofing salts because it does not cause stiffening or otherwise adversely affect the handle and feel of fabrics, paper and the like, and because it shows no tendency to effloresce to the surface upon prolonged storage.

Sulfamates may be applied by impregnation as water solutions. They are not removed by dry cleaning treatments. Other advantages of importance in specific applications have been noted, and many additional industrial applications for this acid may be expected. In several systems ammonium sulfamate has shown less tendency to coagulate colloidal solutions than other inorganic salts.

New Trade Marks of the Month

378,396. Derris, Inc., New York City; May 13, '36; drain pipe cleaner; use since Apr. 15, '36.

388,680. Kant-Rust Mfg. Co., Holdenville, Okla.; Feb. 9, '37; preparation for prevention rust in radiators, corrosion in boilers, and serving as an anti-freeze when added to alcohol; use since Oct., '36.

392,488. General Dyestuff Corp., N. Y. City; May 8, '37; soluble cellulose product for use in industrial arts, particularly as a binder or plastic; use since Jan. 13, '30.

393,825. Standard Oil Co. of N. J., Wilmington, Del.; June 8, '37; cable oil; use since Aug. 22, '22.

393,878. Standard Transformer Co., Warren, Ohio; June 9, '37; transformer oil; *i.e.*, oil used with oil-immersed transformers; use since Jan. 15, '37.

395,410. Gillespie Varnish Co., Jersey City, N. J.; July 19, '37; paints, lacquers, similar paint products, asphaltums, distemper colors, automobile and furniture polish, etc.; use since 1890.

395,860. J. B. Ford Co., Wyandotte, Mich.; July 31, '37; cleaning compound; use since Jan. 1, '37.

395,907. Dalmatia Portland Cement Works Co., Ltd., Castel Suciuraz, Yugo Slavia; Aug. 2, '37; Portland cement; use since Nov., 1924.

396,222. Calgon, Inc., Pittsburgh, Pa.; Aug. 10, '37; compound having water softening and germicidal properties, for use in washing glasses used in public places, dairy bottles, etc., which under public laws require germicide in washing; use since Aug. 3, '37.

396,618. Thresher Varnish Co., Dayton, Ohio; Aug. 20, '37; paints, paint primers-enamels, lacquers, and paint reducers; use since Apr. 27, '34.

396,939. Van Camp Sea Food Co., Terminal Island, Calif., Aug. 30, '37; fertilizer; use since Aug. 14, '37.

397,432. Betzold Bros., Phila., Pa., Sept. 15, '37; preparation for softening fur garments; use since Feb. 1, '37.

398,073. Goulard & Olena, Inc., N. Y. City; Sept. 28, '37; tree saver; use since May, '36.

398,225. David Wroblewski (D. Wroblewski & Co.), Brooklyn, N. Y.; Oct. 6, '37; sudless cleaning powder; use since June 1, '14.

398,756. Coastal Chemical Co., Harlingen, Tex.; Oct. 21, '37; agricultural insecticides; use since May 10, '37.

398,893. Eisler Electric Corp., Union City, N. J.; Oct. 25, '37; chemicals for use in forming fluorescent coating on tubing and bulbs for electric lamps; use since July 1, '36.

399,476. Resolute Oil Corp., Great Falls, Mont.; Nov. 8, '37; gasoline; use since Jan., '37.

399,824. Cascade Sprayer Co., Seattle, Wash.; Nov. 17, '37; germicide composed of a liquid chlorine composition; use since Sept. 15, '36.

400,004. Glidden Co., Cleveland, Ohio; Nov. 22, '37; ready mixed paint; use since Jan. 14, '31.

399,639. Cle-Sof Products, Chicago, Ill.; Nov. 10, '37; hand soap which protects and cleans; use since Apr. 26, '35.

400,440. Sno-White Mfg. Co., Monongahela, Pa.; Dec. 3, '37; cleanser and alkaline chemical salt compositions to be used in water to form cleaning solutions for surfaces, fabrics, etc.; use since June 1, '37.

400,513. John Thompson Lovett, Jr. (Economy Nursery Co.), Little Silver, N. J.; Dec. 6, '37; soils compounded of humus, peat and loam; use since Nov. 18, '37.

400,785. National Broach & Machine Co., Detroit, Mich.; Dec. 13, '37; broaching and lapping compounds; use since Aug. 1, '30.

401,075. Porter Paint Co., Louisville, Ky.; Dec. 20, '37; paste and wall paints, colors in oil, and varnishes; use since Jan., '30.

401,113. J. J. Harpel (Zefer Mfg. Co.), Denver, Colo.; Dec. 21, '37; household and industrial cleaner or solvent; use since Aug. 3, '37.

401,488. A. C. Horn Co., Long Island City, N. Y.; Jan. 3, '38; varnish sealer for plywood; use since June 1, '37.

401,277. Schalk Chemical Co., Los Angeles, Calif.; Dec. 27, '37; floor cleaner; use since June 1, '31.

401,471. Conewango Refining Co., Warren, Pa.; Jan. 3, '38; composition for treatment coal to prevent dusting and to improve its characteristics; use since Nov. 24, '37.

401,498. Montgomery Chemical Co., Los Angeles, Calif.; Jan. 3, '38; embalming fluids including cavity fluid and arterial fluid; use since July, 1937.

401,522. Curtin-Howe Corp., N. Y. City; Jan. 4, '38; compositions for treating metal surfaces to generate thereon in situ protective surfaces, especially for reception of coatings; use since Nov. 4, '37.

401,523. Darco Corp., Wilmington, Del.; Jan. 4, '38; refrigerator deodorant; use since Feb. 24, '33.

401,569. B. F. Goodrich Co., Akron, Ohio, and N. Y. City; Jan. 5, '38; automobile greases and oils of all kinds; use since May 1, '37.

401,579. Mallinckrodt Chemical Works, St. Louis, Mo.; Jan. 5, '38; mixture calomel and corrosive sublimate for treatment of brown patch in grass; use since Jan., '28.

401,581. Mallinckrodt Chemical Works, St. Louis, Mo.; Jan. 5, '38; hydrogen peroxide; use since Oct., '35.

401,582. Mallinckrodt Chemical Works, St. Louis, Mo.; Jan. 5, '38; industrial chemicals; use since Apr. 27, '32.

401,665. General Chemical Co., N. Y. City; Jan. 7, '38; cleansing and detergent preparation; use since Nov. 29, '37.

401,686. Baldwin Labs., Inc., Saegertown, Pa.; Jan. 8, '38; shoe white; use since Oct. 11, '37.

401,687. Barrett Co., N. Y. City; Jan. 8, '38; filler for seams and joints in roadways; use since Nov. 4, '37.

401,701. Oil Specialties & Refining Co., Brooklyn and N. Y. City; Jan. 8, '38; polishing wax for floors and metal; use since Dec. 9, '31.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, March 29 to April 19.

Lacquer Finishing Method Cuts Cost

A method of preparing lacquer finishes for automobiles, furniture, wood and similar commodities, which is expected to save consumers millions of dollars was announced at the recent A. C. S. meeting held in Dallas. Paper was read by Herbert L. Wampner, who developed process with Chas. D. Bogin, both of Commercial Solvents Corp., Terre Haute, Ind. Heat is the basis of new method, which involves use of concentrated lacquer in the thickened form, diluted with a 50 per cent. solvent which is thin and light.

401,699. Oil Specialties & Refining Co., Brooklyn and N. Y. City; Jan. 8, '38; furniture and automobile polish; use since July 20, '35.

401,718. American Bitumuls Co., Wilmington, Del., and San Francisco, Calif.; Jan. 10, '38; adhesive binders for paper and fibreboard products; use since Feb. 25, '32.

401,729. Max Factor & Co., Los Angeles, Calif.; Jan. 10, '38; photographic developer and printer; use since Dec. 31, '37.

401,762. Arcade Laboratories, Freeport, N. Y.; Jan. 11, '38; compound for preventing formation barnacles on boats; use since Apr. 6,'34.

401,825. Linde Air Products Co., N. Y. City; Jan. 12, '38; non-metallic welding compositions; use since Mar. 31, '37.

401,840. R. T. Vanderbilt Co., N. Y. City; Jan. 12, '38; selenium-diethyl-dithiocarbamate used as accelerator and vulcanizing agent in manufacture rubber products; use since Dec. 17, '37.

401,852. E. I. du Pont de Nemours & Co., Wilmington, Del.; Jan. 13, '38; nitrate of ammonia compounds; use since July 29, '36.

401,884. Bitu-Rock Corp., Merchantville, N. J.; and Phila., Pa.; Jan. 14, '38; bituminous road surfacing materials; use since Dec. 24, '37.

401,933. Wm. E. Hooper & Sons Co., Balto., Md.; Jan. 15, '38; fire resisting paint; use since Jan. 15, '37.

401,945. Phosphate Mining Co., N. Y. City; Jan. 15, '38; fertilizer and fertilizer materials; use since Jan. 5, '38.

402,231. Midland Chemical Labs., Inc., Dubuque, Iowa; Jan. 22, '38; dry cleaning aid to be added to stock solution and used in dry cleaning establishments; use since Jan. 10, '38.

402,054. Astro Chemical Co., San Antonio, Tex.; Jan. 18, '38; anti-freeze compounds; use since Dec. 30, '37.

402,068. National Aniline & Chemical Co., N. Y. City; Jan. 18, '38; tanning preparations; use since Oct. 10, '36.

402,083. Barteldes Seed Co., Denver, Colo.; Jan. 19, '38; weed-killer compounds; use since Nov. 26, '37.

402,119. Ever-Plastics Corp., N. Y. City; Jan. 20, '38; synthetic compound for use as a filler between stone, wood, metal, etc.; use since Oct. 30, '37.

402,167. American Aniline Products, Inc., N. Y. City; Jan. 21, '38; compounds for after-treatment dyed materials for enhancing their fastness; use since Dec. 10, '37.

402,168. American Aniline Products, Inc., N. Y. City; Jan. 21, '38; dyes; use since Dec. 10, '37.

402,169. American Merchandise Co., N. Y. City; synthetic plastic; use since Nov. 1, '37.

402,181. Geigy Co., Inc., N. Y. City; Jan. 21, '38; dyestuffs, lakes, and products suitable for dyeing and printing purposes; use since Aug. 30, '33.

402,182. Geigy Co., Inc., N. Y. City; Jan. 21, '38; tanning materials and products useful for tanning purposes; use since Oct. 13, '31.

402,222. Industrial Oil Corp., Warren, Pa.; Jan. 22, '38; lubricating oils and greases; use since Dec. 31, '37.

402,257. General Paint & Varnish Co., Chicago, Ill.; Jan. 24, '38; paints and enamels; use since June, 1928.

402,328. Champion Paper & Fibre Co., Canton, N. C.; Jan. 26, '38; talloel, sometimes known as tall oil; use since May 24, '34.

402,489. Standard Oil Co. of Calif., Wilmington, Del., and San Francisco, Calif.; Jan. 29, '38; petroleum fuel oils; use since Jan. 18, '38.

402,330. Corrosion Control Corp., N. Y. City; Jan. 26, '38; composition for use as corrosion resisting material; use since Dec. 21, '37.

402,347. Standard Insulation Co., East Rutherford, N. J.; Jan. 26, '38; floor covering or insulating material made of cork and paper; use since Dec. 6, '37.

402,412. Buck & Stoddard, Inc., Los Angeles, Calif.; Jan. 28, '38; commercial calcium carbonate; use since July 13, '37.

402,429. Martin-Senour Co., Cleveland, O.; Jan. 28, '38; paints, enamels, lacquers, and other paint products; use since Apr. 2, '37.

402,447. Sherwin-Williams Co., Cleveland, O.; Jan. 28, '38; paints, lacquers, white lead, etc.; use since Jan. 3, '38.

402,521. Glidden Co. (Chemical & Pigment Co.), Cleveland, O.; Jan. 31, '38; paint pigments; use since Oct. 23, '37.

402,576. Michal Sienkiewicz, N. Y. City; Feb. 1, '38; shoe polish; use since Jan. 2, '38.

402,544. Trinity Portland Cement Co., Chicago, Ill.; Jan. 31, '38; Portland cement; use since Oct. 1, '36.

402,599. Clarence J. Latta, Jr., Fleming, Colo.; Feb. 2, '38; anti-freeze; use since Oct. 1, '37.

402,609. Swift & Co., Chicago, Ill.; Feb. 2, '38; glue; use since Jan. 5, '38.

402,626. H. B. Davis Co., Balto., Md.; Feb. 3, '38; paints, paint enamels, stains, lacquers, and varnishes; use since Jan. 25, '38.

402,649. Procter & Gamble Co., Cincinnati, O.; Feb. 3, '38; soap flakes; use since Jan. 5, '38.

402,688. Mathieson Alkali Works, Inc., N. Y. City; Feb. 4, '38; sodium chlorite; use since Aug. 28, '35.

402,713. California Spray-Chemical Corp., Wilmington, Del., and Richmond, Calif.; Feb. 5, '38; herbicides; use since Jan. 25, '38.

402,714. California Spray-Chemical Corp., Wilmington, Del., and Richmond, Calif.; Feb. 5, '38; herbicides; use since Jan. 25, '38.

402,814. Claude H. Daniels, East Portchester, Conn.; Feb. 8, '38; deformable rubber and cork composition in form of pasty mass for use in parts of shoes, gaskets, etc.; use since Jan. 31, '38.

402,715. California Spray-Chemical Corp., Wilmington, Del., and Richmond, Calif.; Feb. 5, '38; herbicides; use since Jan. 25, '38.

402,716. Calorider Corp., Old Greenwich, Conn.; Feb. 5, '38; deliquescent material for purifying and conditioning air; use since Jan. 28, '38.

402,736. Midway Chemical Co., Jersey City, N. J.; Feb. 5, '38; glass cleaning preparation; use since Jan. 10, '36.

402,760. Artwise Kolor Co., Berkeley, Calif.; Feb. 7, '38; drawing inks and cartographic colors; use since Nov. 13, '37.

402,788. Wm. Outon (Cello-O-Flex Co.), Chicago, Ill.; Feb. 7, '38; non-explosive and non-burning, sizing, and dressing fluid, for use on fabrics; use since Dec. 1, '36.

402,865. Nellie-Lou Corp., Norwalk, Conn.; Feb. 9, '38; household cleaning paste; use since Feb. 2, '38.

402,894. Continental Oil Co., Ponca City, Okla.; Feb. 10, '38; lubricating oil; use since June 1, '31.

402,896. Continental Oil Co., Ponca City, Okla.; Feb. 10, '38; lubricating grease; use since Feb. 1, '35.

402,897. Continental Oil Co., Ponca City, Okla.; Feb. 10, '38; lubricating oil; use since Feb. 1, '33.

402,899. Continental Oil Co., Ponca City, Okla.; Feb. 10, '38; lubricating grease; use since Feb. 1, '35.

402,901. Continental Oil Co., Ponca City, Okla.; Feb. 10, '38; lubricating oil; use since Aug. 26, '35.

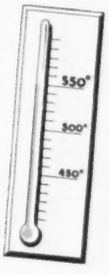
402,938. Distillers Co., Ltd., Edinburgh, Scotland; Feb. 11, '38; liquid fuel for internal combustion engines; use since May 17, '21.

Mothproofing Chemical

Pentadichlorothioxydiphenyl sulfonic acid so far has shown most promise as an agent for mothproofing woolen materials, according to E. A. Back, U. S. Dept. Agriculture, speaking recently at a meeting of the N. Y. Section, A. A. T. C. C.

"550° F—and still not brittle!"

Gruelling Heat-Test Shows NEW *Tri-Sure* CLOSURE-GASKET for Steel Barrels *Resists Up To 550° F*



Now comes a *new*, advanced gasket for TRI-SURE Flanges to meet the special requirements of high oven heat—offering a safety margin above and beyond that of the Standard Flange Gasket. This new, improved TRI-SURE Gasket is so stubbornly heat-resistant that even 550° F. of scorching heat for 20 minutes does not affect it. It meets all specifications. In addition, it is genuinely, positively leakproof!

The new TRI-SURE "550" Gasket for severe heat conditions, takes its place as an alternate alongside the TRI-SURE Standard Gasket, and meets the demands of modern drum manufacture. If it is necessary to subject your drums to higher-than-average baking temperature, be sure to specify the new, heatproof TRI-SURE "550" Flange Gasket when you place your next drum order. Now, more than ever, you're *sure* with TRI-SURE!

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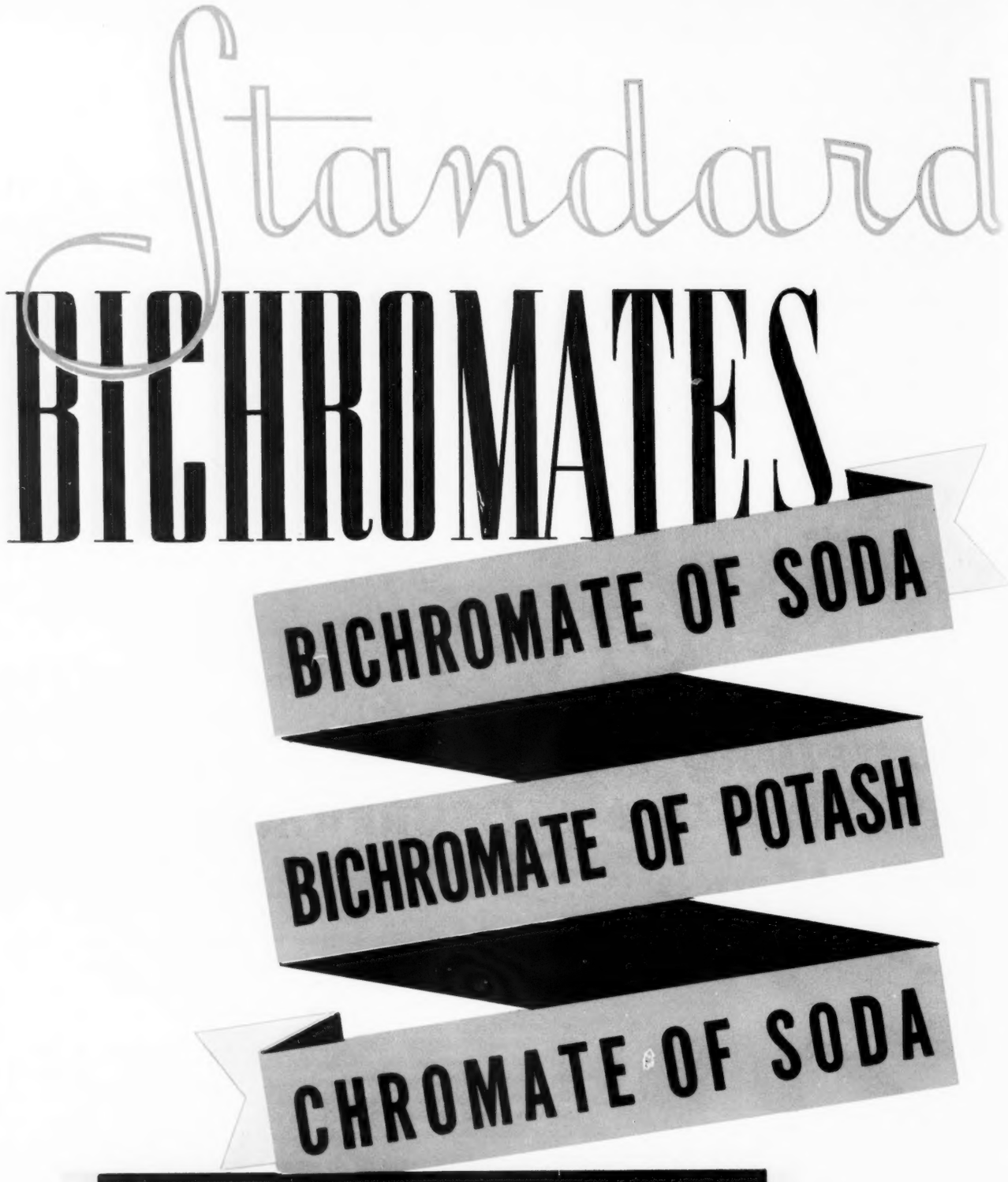

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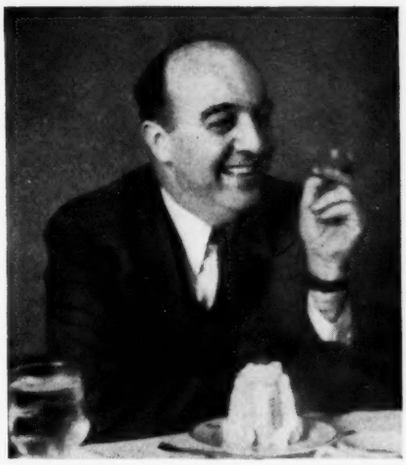
STANDARD CHROMATE DIVISION

Diamond Alkali Company, Painesville, Ohio



Even a great sales manager must eat to live—left to right, Herbert B. Prior of Prior Chemical Corp.; G. Lee Camp of Monsanto, and Leland Doan of Dow.

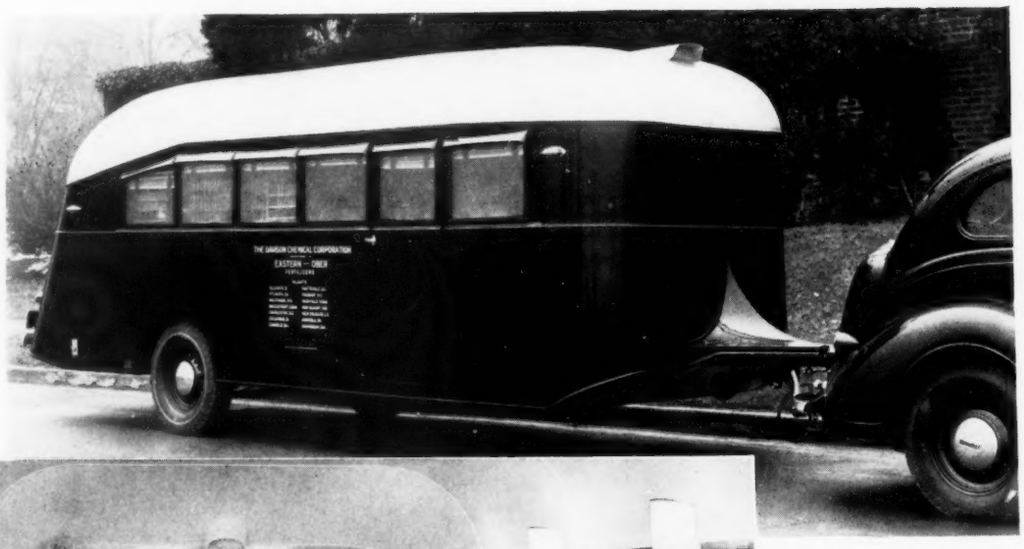
Two Metropolitan visitors—left, W. Scott Hammond, southwestern sales manager, Mathieson, from Houston, and right, Sam Abbot, Jr., of S. L. Abbot Co., from San Francisco.

Dr. Sterling Temple, chemical director, du Pont's R. & H. Chemicals Dept., Niagara Falls, who was recently awarded the Jacob Schoellkopf Medal for 1938.

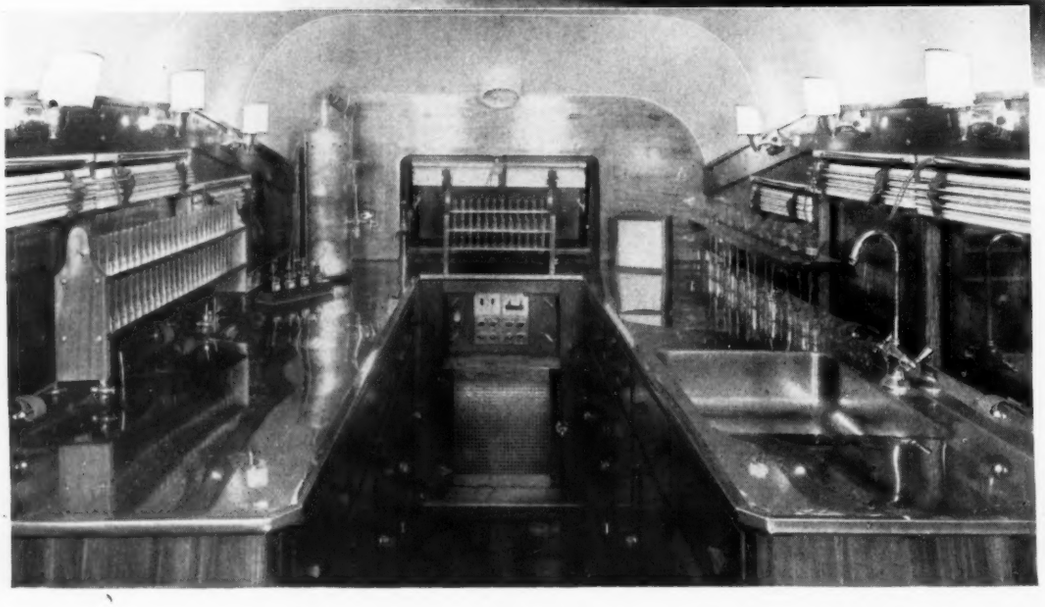
Albert B. Baker ("Bake") of Bradley & Baker, with his art gallery of friends and hobbies.

First Aid to Depressed Sales

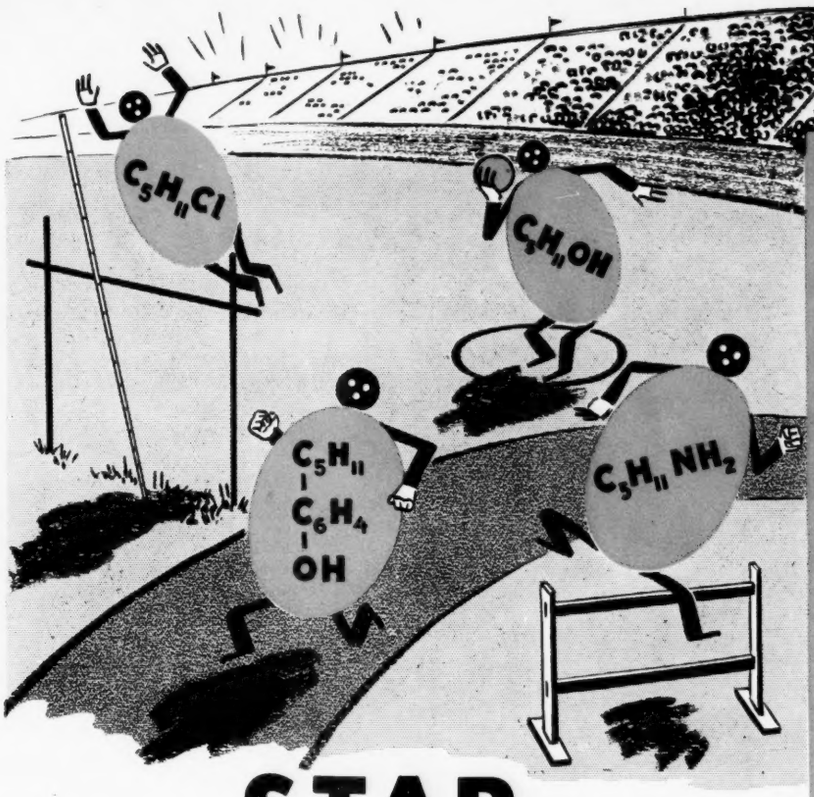
Bakelite has staged in New York and now sent out on the road an information show on phenolic resins and their uses, called the "Bakelite Travelcade" or "Modern Plastics for Modern Living." The picture shows the interested listeners to the talk by R. J. Moore, development manager of Bakelite's resin and varnish division, at the Paint and Varnish Symposium, at the New York Museum of Science and Industry. J. A. Fredrickson, of Masury, presided. Three symposiums were held in New York, and during April have been held at the University of Newark; at the Jersey City Y. W. C. A.; at the Somerset High School, No. Plainfield; at the Lafayette School, Bound Brook; and the New Jersey tour is being completed this May at Elizabeth, Bayonne, and Hackensack. In June it goes to the Franklin Institute for six months and thence to the World's Fair.



A traveling soil-testing laboratory has recently been sent out through the Southeastern States by the Davison Chemical Corporation.



A complete soil laboratory has been fitted up, based on experience with testing over 11,000 soil samples, and fitted with the modern conveniences for this type of laboratory work, leading to definite fertilizer recommendations.



STAR PERFORMERS

Frequently the research chemist has need for a "star performer"—a raw material that will enable him to synthesize the exact product he wants.

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Dimethyl Ethyl Carbinol
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Diamyl Phenol
Ortho Amyl Phenol
Monoamylamine
Diamylamine
Triamylamine
n-Monobutylamine
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n-Tributylamine
Monoamyl Naphthalene
Diamyl Naphthalene
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"Twenty Years Ago"

More anniversary pictures of chemical leaders who served in the U. S. Army during the World War.

Left to right, C. Lalor Burdick, First Lieut., Ordn., (development dept., du Pont). John D. Rue, Capt., O.R.C., C.W.S. (chlorine sales and service, Hooker, Niagara Falls). A. C. Fieldner, Major, C. W. S. (U. S. Bureau of Mines since 1917, now at the Washington office). Herman H. Hanson, Capt., U. S. A. Sanitation Corps, is now State Chemist for the Delaware State Board of Agriculture. Below, Wm. A. Hamor, Major, C.W.S., has been assistant director of Mellon Institute since 1916.

Aaron E. Carpenter, Major, Q. M. Res. Corps (president, E. F. Houghton & Co.). Below, left, Dr. W. L. Lewis, Capt., Ordn. Dept., director, Dept. Scientific Research, Inst. American Meat Packers. W. R. Kirner, Second Lieut., C.W.S. (Coal Research Lab., Carnegie Inst. Technology).

John Sedgwick Cooke, Major, U. S. Infantry, has been associated with Wm. S. Gray & Co. since 1922, now vice president.

Above, Chas. L. Gabriel, First Lieut., C.W.S., has been connected with Commercial Solvents for many years, now vice president. Extreme right, Kenneth E. Bell, Second Lieut., C.W.S., (director research, A. C. Lawrence Leather Co., Malden, Mass.).

RIDDLE:

WHEN IS A TABLESPOONFUL . . . HALF EMPTY? . . .

Product problems . . . particularly in the field of phosphates . . . constantly challenge the ingenuity of Victor's research chemists. Typical, was the problem posed by ordinary tri-sodium phosphate . . . long a popular household and industrial water softener and cleanser.

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MILLIONS FOR CHEMICAL EXPANSION

Economist D. P. Morgan Reports Chemical Companies Will Spend This Amount in 18 Months if Business is Permitted to Resume Normal Course—2,000 Attend Dallas A. C. S. Meeting—McMillen, Farm Chemurgic Head, Sees Adoption of Power Alcohol Without Legislative Help—Chemist Advisory Council Seeks Funds to Help Unemployed Chemists and Chemical Engineers—

World activity in chemical research, on which, it is pointed out, all nations are relying in their effort to solve problems of national defense, adequate nutrition, economic independence, social welfare, and industrial and agricultural prosperity, were reported in more than 250 papers and addresses delivered before the 95th meeting of the A. C. S., convening at Dallas on April 16.

Emancipation of American industry from foreign sources and developments of industrial chemistry in the Southwest were two of the principal themes.

Presentation of two outstanding chemical honors were made by Dean Frank C. Whitmore, Penn. State, president of the Society, at the opening session. The first Francis P. Garvan Gold Medal, established to acclaim distinguished service by women chemists, was awarded to Prof. Emma Perry Carr, head of the chemistry department of Mt. Holyoke College, for her researches in physical chemistry, "especially on the structure of organic molecules by means of absorption studies in the far ultraviolet portion of the spectrum."

The $1,000 Eli Lilly and Co. Award in Biological Chemistry was presented to Prof. Abraham White of Yale for his work on sulfur metabolism and protein hormones. The prize goes to Dr. White, 30 years of age, in recognition of "outstanding research of unusual merit for an individual on the threshold of his career."

Chemical Companies Ready to Spend

The leading chemical companies in the U. S. are ready to spend $100,000,000 on expansion in the next 18 months if they are assured that business will be allowed to resume its normal course of progress, Dr. D. P. Morgan, chemical economist of Scudder, Stevens and Clark, investment counsel of N. Y. City, declared in an address on "The Chemical Industry and Economic Progress," at the opening session. Encouragement of capital expenditure by industry rather than pump priming was urged by Dr. Morgan as a means of bringing about recovery from the present recession. Dr. Morgan asserted that the chemical industry is in an excellent economic position if inflation should come.

"A large proportion of the output of many chemical companies is sold to other companies in the same industry," Dr. Morgan explained. "Consequently, when the consumption and production of all the companies is lumped together to give a complete picture of the chemical industry as a whole, the ultimate raw materials required by this group are materials like water, nitrogen and oxygen from the air and products extracted from the earth like water, brine, sulfur, coal, limestone. Accordingly, viewing the entire industry as a single unit, it can be said that it is in a very strong position to resist even a very extreme inflation of commodity prices, such as might cause considerable embarrassment to less well protected industries."

As a result of his analysis on employment, payrolls, exports, production and profits, Dr. Morgan showed that the chemical industry had made greater economic progress between the 5-year period ending in '37 and the corresponding period ending in '29, outstripping 12 other major industries including automobiles, building materials, iron and steel, petroleum and textiles. Statistically, the chemical industry was first in average ratio gains in employment, payrolls, exports, production and profits, he explained.

"The chemical industry has increased employment and payrolls more than any of the 13 industries studied in the period 1933-1937, employment being up 24.5 in average ratio and payrolls up 31.4 from the composite of the whole group as compared with a five-year period 1924-1929," Dr. Morgan reported.

"In exports the chemical industry is far in the lead, showing an increase of 105.8% over the composite of all domestic industries. In imports the chemical industry is the runner-up, and a close second to the paper industry, whose portion, incidentally, in view of the current developments in the South, is none too secure. The paper industry showed an increase of 39.4% and the chemical industry 36.7% from the base of all imports.

'From the ratios of the 10 leading chemical companies in the U. S., we find that the chemical industry with a ratio of 195.7 leads the nation's 12 major industries in industrial production. The petroleum refining industry is second with a ratio of 133.2.

"Chemicals lead in net profits gains, being 40.4% ahead of the ratio of 1,300 manufacturing companies. This is a definite and striking economic advance for the chemical industry since other ratios were computed on the basis of a much smaller number of companies.

Chemical Ratio Less

"Although there is a prevalent opinion that chemicals have led in price reductions, the figures for the industry as a whole indicate that, although chemicals are off about 14.4%, the other industries are off more and therefore the chemical ratio is for the first time less than that for the composite of all the other groups.

"Chemicals experienced greater proportionate declines in raw material prices, but 7 other industries exhibited greater price declines in finished goods than chemicals."

Dr. Morgan stated that the chemical industry is a good employer, paying better than average wages and increasing wages more than the average industry. It has also increased the number of employees by 24.5% and the total payrolls by 31.4% more than any of the eleven major industries considered.

Progress in Agrol Reviewed

Wheeler McMillen, new president of the Farm Chemurgic Council, succeeding the late Francis P. Garvan, speaking at the 4th annual chemurgic conference, held at the Hotel Fontennelle, Omaha, Neb., on April 25-27, told his audience that the leaders of the movement to establish the use of power alcohol on a huge commercial scale were opposed to the idea of furthering the cause through the use of legislation, but rather felt very confident that power alcohol for motor fuel should and would succeed on its own economic and scientific merit.

New president, who is also editor of *Country Home*, outlined the future program of the Council. Briefly the objects are:

To expand the knowledge of possibilities for research to increase farm income and national wealth; to serve as a clearing house for all chemurgic information; to direct attention of private and industrial laboratories to chemurgic projects and to create popular support in behalf of research in public laboratories and education institutions; to encourage commercial application of chemurgic research accomplishments whenever ready for profitable use; to discourage unsound promotions; to finance, in some instances, desirable research projects which neither public nor private laboratories are in position to undertake; and to aid and cooperate with other agencies employed with allied efforts.

Leo M. Christensen, vice-president and general manager, Atchison Agrol Co., Atchison, Kan., reporting on "Agrol" stated that within a year the cost of denaturing has been reduced $0.0674 per gal. Saving for daily capacity operation is $674, or $235,900 a year of 350 working days. Translated to the raw materials used, saving is equivalent to $0.168 per 56 lb. bushel or $0.301 per hundred weight.

Chemist Advisory Council

The Chemist Advisory Council, of which Dr. Walter S. Landis of Cyanamid is president, is rapidly shaping up its plans for assisting unemployed chemists and chemical engineers and for putting into actual practice the rather broad program of objectives adopted as the goal of the new body.

A campaign for funds from private individuals has already been launched and a second campaign will soon be started for the solicitation of contributions from companies in the chemical and allied fields. So far the response from individuals has not been as good as was hoped for. Funds are urgently needed and contributions, no matter how small, will materially assist in the work of aiding the real chemist and chemical engineer who unfortunately is without a connection to obtain a satisfactory position. Unless the unemployed are helped over the current period many of these men will be definitely lost to industry when conditions improve, and they are desperately needed. Contributions should be sent to treasurer, Robert T. Baldwin, 50 E. 41 st., N. Y. City.

The executive committee of the Council after serious consideration of what its objectives should be have decided that it must limit its activity to aiding those who are actually chemists and chemical engineers, men or women who in a general way would qualify for membership in such professional bodies as the A.I.Ch.E., or the A.I.C. Of course, membership in these associations or any other group is not a requirement, but the Council cannot undertake to aid, at least for the time being, the young graduate just out of school or with a year or two of experience, or those who are really only laboratory assistants.

Plans are being formulated for placing the employment agency angle of the work on a business-like basis, complying with all the regulations of the State of New York. Within a short time this phase of the work will probably take on a national scope with offices being opened in a few of the principal cities.

Board of Trade Lunches

Management-employee relationships was the topic at luncheon meeting of the Drug, Chemical and Allied Trades Section of the N. Y. Board of Trade, April 27, held at the Hotel Astor.

Section was addressed by Walter D. Fuller, president, Curtis Publishing, Philadelphia, and Charles P. McCormick, president of McCormick & Co., Baltimore. Program was under the direction of Hugh Craig, managing editor of the *Oil, Paint and Drug Reporter*. Other luncheons are being planned for by a special committee appointed by Philip A. Dinkins, chairman of the section.

Lammot du Pont Flays "Spirit of Spending"

Reviews Detriments to Business Recovery at U. S. Chamber of Commerce Meeting—Swanson is Osborne Medalist—Kraus Awarded Franklin Institute Medal—Kraemer Wins Lalor Prize—Board of Trade Meeting—Personal News—

Detriments to business recovery were outlined by Lammot du Pont, president of the du Pont company, as "the spirit of spending, the reflection on profits, and the regulation of management which prevents creation of profits." Mr. du Pont, speaking at the 26th annual meeting of the U. S. Chamber of Commerce in Washington on May 2, stated that these factors are the things that make scarce "enterprise capital," capital upon which return at a specific time is not expected, but upon which it is hoped will be realized many fold returns some day. Pointing out that no industry can proceed very long without additional capital, the chemical industry leader said that manufacturing industry is particularly dependent upon capital of an enterprise nature.

Kraus' New Honor

Dr. Charles A. Kraus, professor of chemistry and director of research in chemistry for Brown University, has been awarded the Franklin medal, given annually by the Franklin Institute. His citation reads "in recognition of his numerous fundamental researches in chemistry and electrochemistry, particularly his valuable contribution to the knowledge of reactions in liquid ammonia, of the chemical behavior of metals and of the properties of electrolytic solutions. Presentation will be made May 20.

Lalor Award To Kraemer

The Lalor Foundation announces a special award of $2,500 to Dr. Elmer O. Kraemer of Wilmington, Del., to facilitate the continuance of his studies of the size and shape of giant molecules, as for example, the molecules of starch, cellulose, rubber and the proteins. Research in this field is becoming of increasingly great importance not only from the theoretical point of view, but also because of its close relationship and application to the fundamental phenomena of biology and medicine. Dr. Kraemer, who is one of the outstanding American scientists working in this field, will carry out these investigations in the laboratory of Prof. The Svedberg at the University of Upsala in Sweden. Dr. Kraemer is resigning from du Pont shortly to leave for Europe.

Swanson—Osborne Medalist

Dr. C. O. Swanson, head of the Department of Milling Industry, Kansas State College of Agriculture and Applied Science, Manhattan, Kans., has been awarded the Thomas Burr Osborne Medal. He will receive the medal at the 24th Annual Convention of the American Association of Cereal Chemists, Hotel Netherland Plaza, Cincinnati, week of May 23. The Thomas Burr Osborne Medal is awarded for distinguished contributions to cereal chemistry as the result of original research.

Names in the News

F. C. Zeisberg, du Pont, and prominent in the affairs of the A.I.Ch.E., lectured on April 30 before the students of 12 universities gathered at the University of Delaware on the subject, "The Importance of Hobbies to Technical Men."

C. H. Whiteman, personnel director, Mathieson Alkali Works at Saltville, has been named chairman of the exhibits committee of the 4th Virginia State-wide Safety Conference, to be held at Norfolk June 3 and 4.

Foster Dee Snell, Brooklyn consultant, addressed the students in the departments of chemistry and chemical engineering at The Polytechnic Institute of Brooklyn on April 8 on the subject of "Opportunities in Chemistry and Chemical Engineering."

Dr. William J. Hale, well-known Dow consultant, was awarded the "Pioneer cup" by the Chemurgic Council in its meeting at Omaha, Neb. This award is the highest given by the group and is given once each year for outstanding pioneer work in chemurgy.

E. L. Luaces, well known N. Y. City consultant on solvent recovery technique, returned May 3 from a 3 months' trip to New Orleans and the Southwest. While away he attended the annual meetings of the American Ceramic Society and the American Water Works Association, both held in New Orleans, and the 95th meeting of the A.C.S. at Dallas.

Victor V. Kelsey, Consolidated Feldspar Co., Trenton, N. J., is the new president of the American Ceramic Society, elected at the 40th annual meeting held at New Orleans, March 28-April 2.

On the Gangplank

Henry Blaise, engineer assistant managing director, Societe Generale des Minerais, Brussels, will arrive in the *Bremen* on May 9 for a brief visit to his interests in this country.

Alfred A. Mazuir, managing director, and Andre Armengaud, general counsel of the French Acticarbone Corp., will arrive in the *Normandie* May 16 and will make their headquarters with Acticarbone Corp., 60 E. 42 st., N. Y. City.

Dr. J. W. Turrentine, president of the American Potash Institute, sailed for Europe on April 29 and will return June 21.

Cottrell to Receive A.I.C. Award

Presentation to be Made at Annual Meeting at Atlantic City on May 14—Purchasing Agents Meet in St. Louis, May 23—Cohoe Heads American Section, Society Chemical Industry—Colburn at University of Delaware—Deaths in April—

Medal of The American Institute of Chemists, presented annually for outstanding service to the science of chemistry or the profession of chemist in America, has been awarded this year to Dr. Frederick G. Cottrell, consulting chemist, metallurgist, and inventor, for his outstanding scientific achievements and for his service to the profession through the support of research. Previous award went to Dr. James F. Norris, professor of organic chemistry at M. I. T.

During the World War, Dr. Cottrell was one of the principal directors of the research which resulted in perfecting a process to recover helium from oil wells gases at a cost of about one cent per cu. ft. Previously helium gas cost $1,700 per cu. ft., making it too expensive for use in aviation or for other purposes. He is also the inventor of the Cottrell precipitator, which by electrostatic attraction cleans gases of fine particles of dust. He was active in the development of the fixation of nitrogen during and after the War. He has given the profits from many of his patents to further scientific research.

Medal will be presented to Dr. Cottrell at the annual dinner of The American Institute of Chemists, which will be held at the Claridge Hotel, Atlantic City, on May 14.

Committee on Nominations, American Institute of Chemists, suggests the following members qualified for elective offices. Election will be held at the annual meeting on May 14. For president: Robert J. Moore, Bakelite Corp.; for vice-president, Ross A. Baker, professor of chemistry, C. C. N. Y., and Joseph W. E. Harrisson, LaWall & Harrisson, Philadelphia consultants; for treasurer, Burke H. Knight, N. Y. City consultant; for secretary, Howard S. Neiman, editor, *Textile Colorist*.

P. A.'s to Hear Moley, Howe, etc.

On May 23, the National Association of Purchasing Agents, whose membership includes more than 5,200 purchasing executives in all lines of industry, will meet in St. Louis, to open the 23rd Annual International Convention of their organization.

Four days of intensive business discussions are planned. Outstanding industrial and public leaders will participate in the program. Raymond Moley, original "brain truster," and Warren Bishop, Washington commentator; Howard Coonley and C. M. Updegraff, industrialists; Dr. Harrison E. Howe, editor, *Industrial & Engineering Chemistry*, and Dr. A. A. Bates, research engineer, and a number of purchasing executives will speak on trends in government, business, research and industrial practices.

The Inform-a-Show, an industrial exposition, in which 70 nationally known companies will exhibit their products is held in conjunction with the Purchasing Agents' convention.

Cohoe Heads American Section

The American Section of the Society of Chemical Industry announces the election of the following officers for the year '38-'39: chairman, Wallace P. Cohoe; vice-chairman, Lincoln T. Work; honorary secretary, Cyril S. Kimball, and honorary treasurer, J. W. H. Randall.

Pearce Succeeds MacKnight

Frank E. Hodek, Jr., president, Porcelain Enamel Institute, Chicago, announces appointment of Charles S. Pearce as secretary to fill position vacated by Geo. P. MacKnight.

Colburn at University of Del.

University of Delaware announces appointment of Dr. Allan P. Colburn as associate professor of chemical engineering and head of the division of chemical engineering of the School of Engineering. Dr. Colburn is well known as a research chemical engineer of the du Pont Experiment Station, and the first recipient of the William H. Walker Award offered annually by the American Institute of Chemical Engineers for an "outstanding contribution to Chemical Engineering literature published in the Transactions by a member."

Constructs New Plant

Compressed Industrial Gases, Inc., with headquarters in Evansville, Ind., has awarded a general contract to F. R. Heavner, Pittsburgh, Pa., for construction of a one-story brick and steel oxygen and acetylene manufacturing plant at Conshohocken, Pa., to cost about $250,000 with machinery and equipment installations.

True (Chew) Virginia Ham

John A. Chew, well known chemical dealer located in the Lincoln Bldg., N. Y. City, not quite so well known as the owner of a farm, a mule, and a number of pigs down in "Ol' Virginny," and serving as maestro of the Chemists' Club round-table, entertained at his apartment on April 22 the regular habitues of that famous spot of banter and innocuous humor and wit. The baked Virginia ham and the fried chicken (strict Southern style) met with instantaneous and prolonged approval.

Deaths of the Month

The Rev. Edward H. Ford, 72, honorary canon of the Episcopal Cathedral Church of St. John of Wilmington, Del., died at his home on April 24, after a short illness.

Mr. Ford for many years was director of the Black Powder division of du Pont, retaining that post for 10 years after his ordination to the ministry in 1921. He entered the employ of the du Pont company in 1906, following experience in various American powder concerns, beginning in 1888 in California.

Dr. Harlan S. Miner

Dr. Harlan S. Miner, 74, for the last 40 years chief chemist of the Welsbach Co., died of a heart attack on April 14 while on a business trip to Bloomfield, N. J.

Graduate from Lehigh University in 1888, he had been associated ever since with the Welsbach company; for 10 years as assistant chemist, and since 1898 as chief chemist. He had done important work in connection with rare earths, radium and the manufacture and development of incandescent gas lights. In 1928 he entertained the late Mme. Curie on her visit to Philadelphia and presented her with a quantity of mezothorium, a helium derivative, for use in her research work.

D. Launcelot W. Andrews

D. Launcelot Winchester Andrews, 81, a distinguished research and consulting chemist and a prominent former resident of Williamstown, Mass., died April 14 at his home, 18 Clarendon road, Belmont, Mass.

Dr. Andrews was graduated from Sheffield Scientific at Yale in 1875 and 7 years later received the degrees of master of arts and doctor of philosophy from Gottingen University, Germany. He later took a graduate course in philosophy and history at Harvard. He was professor of chemistry at Iowa Agricultural College in 1884 and 1885 and at Iowa State University from 1885 to 1904.

Dr. Andrews was a research and consulting chemist for Mallinckrodt Chemical, St. Louis, from 1904 to 1910; special investigator in canning for the Department of Agriculture in 1913 and 1914, and a research chemist for Victor Chemical, from 1915 to 1921.

Other Deaths in April

William C. Stobaeus, for many years connected with Charles Cooper & Co., and later did consulting work, died on April 9. . . . Mrs. Lina Pease Teeple, widow of the well known consultant, the late John Edgar Teeple, died April 5. . . Frank Dudley, 70, vice-president and secretary of J. H. Day Co., manufacturer of paint machinery, on April 14. He joined the company in 1888.

News of the Specialties

Little Heads Colgate

E. H. Little was elected president of Colgate-Palmolive-Peet at the directors' meeting which followed the annual meeting of stockholders in Jersey City, April 27. S. Bayard Colgate was re-elected chairman of the board of directors, having assumed the duties of that office in addition to those of the president upon resignation, as chairman, of Charles S. Pearce last Summer.

Wilson Resigns From Good

Frank E. Wilson, former sales manager of James Good, Inc., Philadelphia, has resigned. Mr. Wilson, well known in chemical and chemical specialty circles, is resting in the Pocono Mountains and his plans for returning to Philadelphia are indefinite at this time.

Specialty Co. News

Noxx Chemicals, formerly of 262 S. Lazelle st., Columbus, Ohio, is moving headquarters into the Peruna Bldg., 244 S. 3 st. Company is a large supplier of chemicals for termite control.

Announcement was made recently of the purchase of a small plant by the Shef Manufacturing Co., makers of mothproofing specialties and deodorants, at 59-61 Chestnut st., Weehawken, N. J.

Property, one-story high on a 50-ft. front plot, was formerly owned by the S. B. Penick Co., and was used as a storage house.

Southern Chemical Corp. has been organized at Charlotte, N. C., and is opening a manufacturing plant at 909 S. McDowell st. for making automotive chemicals, radiator specialties, granulated cleaners, and liquid soaps. Wilson McMakin is president of the new firm. He is a native of Charlotte and formerly was connected with the American Trust Co.

O. S. Gage, 112 S. Madison ave., Tulsa, Okla., has obtained a patent on a new type of automobile polish and will install a small factory for producing the product for commercial use.

Northern Chemical, a new producer of cleaning compounds, is located at 649 Factory st., Watertown, N. Y. Thomas M. Flavin is president.

Marion Plant Life Chemical is a new concern with headquarters at Marion, Ohio.

Park Chemical, Chillicothe, Mo., opens a new branch at Alliance, Neb. This branch distributes the same products as those distributed through the company's main office.

N.A.I.D.M. Announces Summer Meeting Program

Large Gathering Expected at Lake Wawasee, Ind., June 13-15—Nat. Oil Products' Earnings Improve in First Quarter Over Final 3 Months of '37—Little, New Colgate-Palmolive-Peet President—Wilson Resigns from Good—News of the Specialty Companies—

Speakers scheduled for the 24th annual summer meeting of the National Association of Insecticide and Disinfectant Manufacturers, which will be held on June 13, 14 and 15 at The Spink-Wawasee, Lake Wawasee, Ind., include a number of outstanding authorities in their respective fields. Subjects to be discussed by guest speakers will include marketing and merchandising of insecticides, disinfectants, and sanitary products, their purchase and use by public institutions, maintenance of sanitation on railroad cars, fly spray formulation, moth products, discussion of the composition and use of cattle sprays, and others. A tentative list of the guest speakers and their subjects follows:

Carl W. Dipman, editor *Progressive Grocer*, "Marketing and Trends in the Grocery Trade"; Prof. J. J. Davis, chief in entomology, Purdue University, Lafayette, Ind., "Future of Household Insecticides on the Farm"; Dr. R. C. Roark, in charge, Insecticide Investigations, Bureau of Entomology and Plant Quarantine, U. S. Dept. of Agriculture, Washington, "Study of Various Formulas that have been recommended for the preparation of Kerosene-Pyrethrum Type of Household Fly Spray"; F. R. Callahan, superintendent of yards (in charge of all rolling stock) Pullman Co., Chicago, Ill., "Sanitation on Pullman Cars from the Insecticide and Disinfectant Standpoint"; Prof. E. Searles, entomologist, University of Wisconsin, Madison, Wis., "Cattle Spray Technique"; Dr. E. A. Back, Principal Entomologist, "Insects Affecting Man and Animals," Bureau of Entomology and Plant Quarantine, Dept. of Agriculture, Washington, "Some Experiments in Testing Fabrics Treated with Mothproofing Solutions."

Also a department representative of the state of Indiana on "Maintenance of Sanitation in Public Institutions"; W. N. Sullivan, Division of Control Investigations, Dept. of Agriculture, "The Effects of Pyrethrins I and II on House Flies—A Method for Determining the Knockdown of Insecticides" by W. N. Sullivan, H. L. Haller, E. R. McGovran and G. L. Phillips, Bureau of Entomology and Plant Quarantine.

Also Dr. F. F. Campbell, assistant professor of entomology, Ohio State, Columbus, "N.A.I.D.M. Fellowship Report on Test Methods against Crawling Insects"; and Dr. George W. Hoover (consultant), Washington, "The Lea Bill and the Federal Trade Commission—New Food and Drugs Act."

In addition to these speakers, numerous problems of the Association membership are scheduled for discussion in reports of the various committees and on the floor of the open meeting. These include the Pennsylvania registration situation, and other new and pending state and federal legislation affecting our members.

The new revised Peet-Grady Test will be presented for discussion and adoption, and there will be a report on chemical methods in evaluating insecticides. The sanitary specialty firms among the members have already planned a special group meeting to be held one afternoon when there will be no session of the general convention. This latter group plans to take up the subject of marketing and specifications for such items as para products, floor waxes, certain soap specialties, etc. General session of convention will start on Monday morning, June 13, at 9:00 A.M. and will be held each morning for 3 days, leaving the afternoons open for group and special committee meetings where necessary.

The general sessions will be preceded by a meeting of the Board of Governors on Sunday evening, at which time it is planned that committees will also assemble to ratify reports which will be presented at general sessions, subject to the call of chairmen. The convention will close on Wednesday evening, June 15, with an informal dinner. Full train and other travel information is now being compiled by John Powell, Chairman of the General Convention Committee. Robert S. Solincky is chairman of the entertainment committee and W. J. Zick is chairman of the program committee.

Gulick Predicts Improvement

A substantial increase in earnings and sales during the first quarter of '38, compared with the last quarter of '37, is reported by Charles P. Gulick, president, National Oil Products, in his quarterly report to stockholders.

Mr. Gulick stated the improvement was largely the result of the last two months' business and predicted a continued upswing in sales and earnings for the remainder of the year.

In a statement before the monthly meeting of the board of directors, Mr. Gulick reported a net profit for the first quarter after normal Federal income tax of $81,360, or earnings of 47c a share on 173,075 shares of common stock. This compares with a net profit of $158,204, or 93½c a share, during the first quarter of '37 on 169,128 shares.

Heavy Chemicals

Cyanides Sharply Reduced in Price

Sodium Cyanide Declines 2½c—Other Cyanides Also Quoted Lower—Tin Salts Reduced—April Volume Slightly Under March Tonnages—Poor Demand for Plating Chemicals—Beacon Buys Scott Chemical—'37 Sulfur Production Up 36%—

Price feature of the April industrial chemical market was the sharp decline in the cyanides. Domestic sodium cyanide was cut 2½c, to a basis of 14c, while the imported was reduced 2¼c, to a basis of 12¾c. Reductions of 3c per lb. were also announced on April 15 for copper cyanide and zinc cyanide, the new levels being 34c and 33c, respectively. Cyanide-chloride mixtures were also quoted lower.

The majority of the other price revisions were caused by further weakness in the metals. Tin straits sank to a new low when foreign advices indicated that considerable confusion had developed over buffer pool plans. Release of March statistics, showing increased stocks and decreased consumption, was also a bearish factor. As the month closed sodium stannate was quoted at 26c; tin oxide at 46c; tin crystals at 31½c; and the tetrachloride at 19c.

The lowering of zinc metal quotations also forced a revision in zinc sulfate. Crystals declined 40c per 100 lbs., to $2.75; flake was off 50c, to $3.10; and powdered dropped 65c per 100 lbs., to a new level of $4.35.

Other price changes during the month included a 3c reduction in ricinoleic acid, a similar decline for sodium abietate, and a ¼c decline in lead nitrate. There were no important advances in April.

April Tonnage Below March Total

Considerable diversity of opinion existed in the trade at the end of the month as to whether or not April tonnages had held up to the improved levels reached in March. In most instances the first two weeks of last month were fairly satisfactory, but some decline in activity was reported in trade circles in the past fortnight.

Demand for plating materials remains dull, due to the unsatisfactory state of production in the automotive areas, and the outlook over the next few months is not encouraging. Alkalies moved out in a routine manner. Consumption of caustic by the rayon manufacturers is decidedly off when comparison is made with the corresponding period of last year. The so-called "summer chemicals," including such items as chlorine, aluminum sulfate, and the various refrigerants are showing definite signs of seasonal expansion. Supplies of copperas are lower because of curtailed activity in steel, but no shortage has been reported. The lower quotations on calcium chloride are expected to stimulate demand for this product for dust laying purposes.

Conditions in the principal chemical consuming industries are generally unsatisfactory for this period of the year. Steel activity dropped below 30% in the first week of May. Plate glass production in the first quarter of '38 was 11,585,129 sq. ft., as compared with 20,742,575 in March of '37. This one month alone had almost twice as much production as the first quarter this year. Canadian newsprint production was off 24.8% and United States output was off 14% in the first quarter. Paper chemicals moved out in better volume in April. Current paper production is estimated at 68% of capacity, compared with 54% in December and 93% at this time last year.

Shipments of rayon yarn registered a 5% increase in April over March. The immediate outlook for production, however, is not bright as manufacturing operations usually decline sharply in May and June. Silk and wool are still dull and further contractions in cotton cloth production have been made, and further curtailment is anticipated in the next two months.

From all indications the peak of spring activity is passing rapidly. The outlook for the summer period is not particularly bright, but there is some optimism that an early recovery will be staged in the coming fall months.

Beacon Acquires Scott Chemical

The Beacon Co., 89 Bickford St., Boston, Mass., acquires the business of Scott Chemical, Lynn, Mass., manufacturer of aluminum, zinc, calcium, and magnesium stearates. Beacon is expanding the Scott line to include a number of the commercially important laurates, palmitates, resinates, and lead linoleate.

New Calcium Chloride Factor

Consolidated Chemical Corp., 32 S. 3rd St., Columbus, Ohio, has been formed to prepare and market the calcium chloride produced by the 4 salt plants still operating in Pomeroy Bend.

Bidel Returns from France

L. A. Bidel, president, Minerals Trading Corp., N. Y. City, returns from an extensive trip to France and to the barytes mines of Boumahni in Algeria. He reports economic conditions in Algeria are fair. The mine which Minerals Trading represents in the U. S. has been taken over by a French group which plans to expand the mining operations.

Important Price Changes

ADVANCED

	Apr. 30	Mar. 31
None.		

DECLINED

Acid ricinoleic	$0.35	$0.38
Copper cyanide	.34	.37
Cyanide chloride mixture:		
45%	.10¾	.11⅞
75%	.15	.17
Lead nitrate	.10	.10¼
Sodium abietate	.10	.13
Sodium cyanide, dom.	.14	.16½
Imported	.12¾	.15
Sodium stannate	.26	.26½
Tin oxide	.46	.47
Tin crystals	.31½	.32
Tin metal	.3665	.38
Tin tetrachloride	.19	.19½
Zinc cyanide	.33	.36
Zinc sulfate, cryst.	2.75	3.15
Flake	3.10	3.60
Powd.	4.35	5.00

'37—Good Year for Sulfur

With an increase of 36% over '36, U. S. production of sulfur in '37 established a new peak of 2,741,970 long tons, according to the Bureau of Mines. Record shipments of 2,466,512 tons valued at $44,300,000 were also recorded for the year compared with 1,968,820 tons valued at $35,400,000 in '36. Above production figures for '37 include a stockpile overrun adjustment of 57,365 long tons produced in previous years, but not accounted for until shipped. Several hundred tons of sulfur-bearing ore used for agricultural purposes are not included in the above total. Stocks at the mines increased from 3,100,000 long tons at the end of '36 to 3,400,000 tons at the end of '37. Production was reported from California, Louisiana, Texas and Utah.

Imports of sulfur ore (all from Chile) were 398 long tons valued at $4,724 while imports of sulfur in any form n.e.s. were 230 tons valued at $38,171.

Exports of crude in '37 totaled 644,005 long tons compared with 547,199 in '36 an increase of 18%.

News Briefs

William R. Rogers, 7-9 Glenwood Ave., Gloversville, N. Y., dealer and manufacturer, is now producing Snow White brand sodium acetate, iron-free and free flowing, packed in barrels and paper bags. . . . Philipp Bros., manufacturers' agent and distributor, is taking additional space at 70 Pine St., N. Y. City. . . Oldbury Electro-Chemical is another company which has been forced to increase its office space. The N. Y. City offices are located at 22 E. 40th St., and are in charge of Harold Fyffe. . . Du Pont has closed its Buffalo rayon plant.

CITRATES

CITRIC ACID

TARTARIC ACID

CREAM TARTAR

ROCHELLE SALT

SEIDLITZ MIXTURE

POTASSIUM IODIDE

PHENOLPHTHALEIN

CALCIUM GLUCONATE

CORROSIVE SUBLIMATE

BISMUTH SUBNITRATE

BISMUTH SUBCARBONATE

IRON and AMMONIUM CITRATE

PFIZER QUALITY

CHAS. PFIZER & CO., INC.

81 MAIDEN LANE, NEW YORK

444 W. GRAND AVE., CHICAGO, ILL.

ESTABLISHED 1849

Fine Chemicals

Bismuth Metal Advanced 5¢

No Increase in Quotations on Salts—Quinine Compounds Advanced—Mercury Declines Further Despite Heavy Sales on Pacific Coast—April Volume Disappointing—Aromatic Chemicals in Poor Demand—Ethyl-Dow Bromine Plant to be Increased Shortly—Seasonal Improvement in Citric and Tartaric Acids—

Poor demand continued to feature the markets for fine chemicals, pharmaceuticals, and aromatic chemicals. For the past several months sudden flurries have been followed immediately by long periods of dullness. Purchasing has been very much of the hand-to-mouth variety. The volume of trading compares very unfavorably with the corresponding period of last year.

After months of steady prices the quotation on bismuth metal was advanced 5c to $1.05. No increase was made in the various bismuth salts despite the fact that producers have been complaining that even at the former price of the metal the price level for the salts was out of line. Competition, of course, is responsible for this situation. The quinine compounds were stronger last month. This move took the trade somewhat by surprise. Quinine sulfate XI was advanced 1½c to 61c, while X was upped 1c to 53c. The other salts were each advanced 1c.

On the downward side of the market further weakness developed in ephedrine alkaloid, the hydrochloride, and the sulfate. Severe competition has kept the market in a state of unsettlement for several months.

Mercury dropped lower in April. Despite fairly sizable purchasing of domestic material in March on the part of several important consumers and foreign representatives, stocks, particularly of foreign material, have increased heavily over the last few weeks. Buyers have remained out of the market in a large way. While no price revisions of the mercurials were reported in April, the prolonged weakness in the metal has accentuated the unsettlement in the price structure.

Sulfanilamide prices gyrated quite a little in the past month. After declining 25c late in April, an advance of 50c was placed in effect on May 3, the current quotation being $1.50 for sizable quantities.

Business in special formula alcohol has been slow for several months past, but prices were fairly well maintained at the new levels established in the previous month. The glycerin market was a routine one throughout the month. The price structure was generally firm. Of more than passing interest in this item was the importation of some 700,000 lbs. of refined from Japan in March.

Menthol quotations fluctuated within narrow limits in the past month and the general tone of the market was one of unsteadiness. Demand has been well below par for several months and stocks under present conditions are ample. Better seasonal conditions have increased the demand for citric acid and the same is true of tartaric. The tartars have held steady at the price levels established in March. Cocoa butter was reduced 1c late in April to a basis of 12c in carlots.

Little Interest in Aromatic Chemicals

Shipments of aromatic chemicals in April were generally disappointing, although some slight pick-up was reported at the close of the month. The two principal price changes in this group were reductions in benzophenone and linalyl acetate.

To Produce More Bromine

Ethyl-Dow Chemical reports that the construction of an additional unit to increase production 75% at the Kure Beach plant for the extraction of bromine from seawater will be undertaken at once. Addition of the unit will raise the capacity of the plant from 137,000 gals. per minute to 200,000 gals. per minute, or 12 million gals. per hour. The Austin Co., Cleveland, is the contractor.

Rise in '37 Production

Domestic production of bromine in '37 amounted to 13,100 short tons, valued at $5,180,177, compared with 10,305 tons, valued at $4,038,438 in '36. Total value of imports of bromine and bromine products in '37 was $225,268, 13% less than in '36.

Ethylene dibromide imported from Germany amounted to 983,075 lbs., worth $190,190, a decrease of 22% in quantity and 10% in value.

Felton Opens L. A. Branch

Felton Chemical, 599 Johnson Ave., Brooklyn, manufacturer of flavors, perfumes, etc., is opening a direct factory and sales branch at 4727 W. Washington Blvd., Los Angeles, in charge of Robert E. Felton.

Fritzsche's St. Louis Branch

Fritzsche Bros., N. Y. City essential oil and aromatic chemical house, opens a St. Louis branch at 308 S. 4 St., under the direction of Franc A. Barada.

Now R. Gesell, Inc.

Ehrmann-Strauss Co., N. Y. City drug and chemical company, located at 200 W. Houston St., changes its name to R. Gesell, Inc.

Important Price Changes

	Apr. 30	Mar. 31
ADVANCED		
Bismuth metal	$1.05	$1.00
Sulfanilamide	1.50*	1.25
Quinine sulfate:		
U.S.P. XI	.61	.59½
U.S.P. X	.54	.53
DECLINED		
Benzophenone	$1.00	$1.05
Ephedrine alkaloid	3.75	4.25
Hydrochloride	2.75	3.25
Sulfate	2.75	3.25
Linalyl acetate	1.35	1.70
Menthol	3.00	3.05
Quicksilver	71.00	72.00

* May 3.

Dr. Max Mueller

Private funeral services were held April 19 for Dr. Max Mueller, prominent manufacturing chemist, who died April 15 at Newark, N. J., at the age of 62. A native of Switzerland, and a graduate of Polytechnic University of Zurich, Dr. Mueller has been identified since 1899 with the chemical industry in the U. S. He began his career with the Societe Chimique des Usines du Rhone, now Societe des Usines Chimiques Rhone-Poulenc, of France, one of the foremost chemical and pharmaceutical concerns in Europe.

In 1899, in the interests of this concern, he came to this country to join Fries Brothers for whom he worked certain of the Rhone-Poulenc processes. He was the first to manufacture saccharin in commercial quantities in the U. S.

In 1919, still in association with the Rhone-Poulenc, Dr. Mueller founded Rhodia Chemical, to manufacture and sell the products of that concern on a larger scale in this country. He served as president and treasurer of this concern, ultimately acquiring complete control. In '30 Rhodia Chemical was purchased by Newport Chemical Works, shortly thereafter becoming a part of the du Pont organization.

In June, '33, Dr. Mueller became chairman of the board and treasurer of Arco Crown Cork & Cap Co., and since that time has held the controlling interest in this concern. He was also president and treasurer of Technical Equipment Corp., engaged in research and development work with headquarters at 120 B'way, N. Y. City.

Ask Jap. Menthol Curb

A movement has been started with the object of obtaining curtailment of imports of Japanese menthol. John B. Strange, Michigan State Agricultural Commissioner, recently met Michigan peppermint growers and possibility of such curtailment through federal means was discussed.

Coal-tar Chemicals

Competition Forces Reduction in Cresylic Acid

Importers and Domestic Producers Compete Keenly for Restricted Volume—Scarcity of Benzol Continues—Creosote Quiet—Good Export Volume in Phenol—Plastics Field Still Slow—No Improvement in Call for Coal-Tar Solvents—Coke Output Declines for 7th Consecutive Month—

Important Price Changes

ADVANCED

	Apr. 30	Mar. 31
None.		

DECLINED

Acid cresylic, H. P.	$0.79	$0.89
L. P.	.87	.92
Cresol, spec. resin grade	.10¼	.10¾
Naphthalene, crude, imp.	1.90	2.15

The Story of Dyes

Leading article in May issue of *Priorities*, published by Prior Chemical, N. Y. City, concerns dyes. Story of the accidental discovery that dyes could be made synthetically by the use of coal-tar derivatives, and the tremendous growth of the chemical industry based on that discovery is briefly sketched. Story also touches on the increasing importance of colors in modern life.

To Make Resins in Sydney

Beck, Koller, Detroit, announces plans have been completed for the opening of a branch plant at Sydney, Australia. A factory is to be established to manufacture the company's synthetic resins and solutions in Australia.

Form Alloys Development Corp.

Frederick D. Foote and Dr. Beram D. Saklatwalla report formation of Alloys Development Corp., N. Y. City, with offices in the International Bldg., Rockefeller Center, as successor to U. S. Rustless Steel and Iron Corp. Elected president of the new corporation, Mr. Foote will be able to devote his entire time to the development and promotion of the low-cost, weight-saving steels whose use he initiated while railroad industry executive in the commercial office of U. S. Steel.

Association of Saklatwalla & Foote brings together the metallurgist whose work with chromium-copper steels pointed the way to Cor-Ten, an outstanding product developed by U. S. Steel research, and the commercial executive of the Corporation who early recognized the important role this superior steel, and steels of its kind, were destined to play in industry.

Dr. Saklatwalla is well known in the steel industry for his work in reducing vanadium ores and his activities with Vanadium Corporation of America. His research on corrosion and the data he has published on this subject have won a prominent position for him in the metallurgical field. His work in chromium-copper corrosion-resisting steels was recognized when he was awarded the Grasselli Medal in 1924.

Competition between imported and domestic cresylic acid became more acute in the past month with the result that domestic price on high-boiling material was reduced to 79c, and low-boiling to 87c. A sharp decline also occurred in the special resin grade of cresol, the new price being based on 10¼c in sizable quantities.

With ample stocks abroad to dispose of, importers of crude naphthalene again lowered quotations, and at the month-end were offering material at $1.90. No change was made, however, in quotations on domestic. Refined naphthalene is now moving out in good seasonal volume. From reports in the trade it appears that the lower price schedule adopted earlier in the year is being well maintained.

The scarcity of benzol in some sections still continues. The call for coal-tar solvents, however, is generally disappointing. Both the lacquer producers and the rubber manufacturers have been operating on curtailed production schedules as the result of poor demand for automobiles. It would appear that this situation will get worse before it improves. The plastics trade is still extremely dull, but shipments of phenol for export are still heavy.

Creosote demand is quiet. The carriers are doing just as little replacement as is absolutely necessary, and they are one of the best customers for this item. Coal-tar colors were in slightly better demand, despite the fact that textile operations are well below normal, indicating that stocks in the hands of consumers have dwindled quite a little in the last few months. Intermediates and coal-tar acids were spotty in the period under review. Coal-tar pitch was quiet.

For 7 consecutive months the production of coke has shown a decline in comparison with the preceding month. The total production during March of by-product coke amounted to 2,675,071 tons, as compared with 2,493,586 in February. While this was a net gain, the daily average in March was 3.1% below that for February. Production in March, '37 amounted to 4,494,563 tons, and for the first quarter of '37 output totaled but 7,931,131 tons, as against 12,843,676 in the corresponding period of last year.

March benzol production totaled 5,998,000 lbs., as compared with 5,575,000 in February, a gain of 7.6%. March, '37 output amounted to 10,737,000 lbs. For the first 3 months production amounted to 17,728,000 lbs., as against 30,628,000 in the first quarter of '37. Light oil output in March totaled 11,043,461 gals., as compared with 10,299,007 in February, and 18,712,299 gals. in March of last year. March tar production amounted to 33,623,735 gals., as compared with 31,356,117 gals. in the preceding month, and 59,492,206 gals. in the same month a year ago.

Burke New Koppers V.-P.

K. R. Burke, general superintendent of the tar and chemical division of Koppers, is now a vice-president. He was formerly with American Tar Products, joining the Koppers organization in '25 when that company was acquired by Koppers. He was made general superintendent in '28.

No Interruption in Shipments

One was killed and 10 injured on April 18 when 3 tanks at the Philadelphia plant of the Barrett Co. exploded. Firemen succeeded in keeping the flames from reaching the Frankford Arsenal which is in the vicinity. No interruption occurred in shipments from the plant.

In Hands of Receiver

Aniline Chemical Manufacturing, Rutherford, N. J., has had a complaint of insolvency filed against it. William Henig, of Hackensack, N. J., has been appointed receiver. Court ordered all interested parties to show cause April 18 why the receivership should not be continued.

Alvin A. Hoffmann

Alvin Anthony Hoffmann, 59, founder and president of the Pennsylvania Coal Products Co. of Petrolia, Pa., for the past 20 years, died April 10 at the Presbyterian Hospital, Pittsburgh, following a heart attack. Funeral services were held April 12, from his residence, 67 S. Jackson st., Bellevue.

Born in Pittsburgh, Nov. 6, 1879, he was widely known throughout the Petrolia district, where he spent much of his time, and in Butler and N. Y. City.

He is survived by his wife, Mrs. Fannie B. McCormick Hoffmann; 3 children, Isabel T. Cooper, at home, Mrs. Ruth Secrist, West View, and Alvin A. Hoffmann, Jr., Petrolia; a brother, J. J. Hoffmann of Rahway, N. J.; his mother Mrs. Lydia Hoffmann Griffith of Pittsburgh, Pa.; and 5 grandchildren.

Mr. Hoffmann was a member of the following associations: The Chemists' Club, A. C. S., Highland Country Club, Pittsburgh; Butler Country Club, Iron City Lodge No. 182, I.O.O.F., Bellevue; honorary member, Petrolia Relief and Fire Association, and the Business Men's Club of Petrolia.

Solvent Prices Steady Despite Poor Demand

Some Unsettlement of Petroleum Solvent Prices Reported in Chicago Area—Automotive Production Decline Affects Solvent Shipments—Formula 11 Will Not Become Effective for Several Weeks—Plastics Field Exceptionally Dull—U. S. I. Acquires Rauh—Acticarbone Acquires Rights to Actisec Process of Dehydration—

Solvents and Plasticizers

The market for petroleum solvents was without important price changes in the past month. Some shading of prices was reported in the Chicago area, but aside from this disturbance, quotations, particularly on tankcar business, were held firm in spite of the curtailed consumption and lack of inquiries for spot deliveries.

Alcohol prices remain unchanged from those announced in March for the second quarter. Ethyl alcohol production in March totaled 18,305,610 proof gals., as compared with 19,873,456 in March of '37. Production of completely denatured amounted to 130,577 wine gals., as compared with 260,002 in the same month of last year. Amounts withdrawn were 121,517 and 226,422 gals., respectively. Stocks at the end of March, '38, totaled 549,026 gals., considerably under the 799,919 gals., reported at the end of March of '37. Production of specially denatured last month amounted to 6,076,362 gals., as compared with 6,292,297 gals. in March of last year. Amount removed totaled 6,048,474 gals., as against 6,309,500 gals. in the same month last year. Stocks totaled 663,519 gals., a sharp gain from the 479,888 gals. reported on March 31, '37.

Consumption of alcohol for industrial purposes has held up remarkably well considering the low state of general business activity. The past anti-freeze season was somewhat of a disappointment. The weather was decidedly against heavy consumption and the inroads of methanol into this market were greater.

March synthetic methanol production was greater than in the corresponding month of '37, the respective figures being 2,343,828 and 2,071,747. Crude production, however, was smaller, totalling 432,800 gals., as against 546,662 gals. in March of last year.

Nothing in the way of new developments can be reported on the markets for acetone, butyl alcohol, ethyl acetate, and the other important solvents and plasticizers. Prices remain fairly steady, but shipments reflect the limited production of lacquers and other finishes.

Automotive production activity has failed by a wide margin to fulfill earlier promises. Manufacturers have been forced to reduce operations in view of lack of buying interest by the public. In the first quarter factory sales, as reported by the Bureau of the Census, totaled only 618,877 units, as compared with 1,237,917 in the same period of last year. General feeling in the Detroit area now is that the industry will be extremely fortunate if the output for the year reaches 3,000,000 units. The solvent needs of the rubber industry naturally reflect in a large measure curtailment of automotive production.

Rather mysterious in some ways is the continued slump in the plastics field. In the earlier depression period the showing in this field was relatively good in comparison with general business conditions. March output of nitrocellulose sheets in the month of March amounted to only 481,134 lbs., slightly better than the figures for January and February, but well under the 1,362,819 lbs. turned out in March of '37. The figures for production of rods and tubes are off in about the same proportion. Output of only 168,073 lbs. of cellulose acetate (sheets, rods, and tubes) during March was a decided slump from even the poor figures for January and February, and makes sorry comparison with the 1,621,103 lbs. produced in the corresponding month a year earlier.

Formula 11 Postponed

The new denatured alcohol formula authorized under date of April 29 to take the place of Formula 11 will not become effective for several weeks in order to permit government chemists to make further tests.

Authorization to use completely denatured alcohol Formula No. 14, the new specification, was issued by the Commissioner of Internal Revenue under date of May 2 to become effective at once. The Treasury Department at the same time announced that completely denatured alcohol Formula No. 11 had been revoked as of July 1, '38.

The new formula provides for the following: To every 100 gals. ethyl alcohol of not less than 160 degrees proof add 5 gallons of FD-13, or a product similar thereto, and 2.25 gals. of methyl isobutyl ketone.

As a formula for the anti-freeze trade the above alcohol solution is said to be effective and more practicable than the C.D.-11 and to meet objections that had been raised against the latter. "F.D.-13" is described as a new denaturing material.

Ellis-Foster Sues Lewis

The Ellis-Foster Co., Montclair, N. J., has filed suit against John D. Lewis, Inc., Providence, R. I., alleging infringement of patents covering the manufacture and sale of resins made from rosin, maleic anhydride, and glycerin. Patents involved are Nos. 1,722,566, 1,843,869, and 2,063,542.

Important Price Changes

ADVANCED

Apr. 30 Mar. 31

None.

DECLINED

None.

U. S. I. Acquires Rauh

To further widen its activities in the chemical field, U. S. Industrial Alcohol has arranged to purchase assets of Robert Rauh, Inc., of Newark, N. J. manufacturer of synthetic resins and ester gums used as a base for lacquers. Products are mainly resins of the phenol type and a small amount of alkyd resins. As consideration for the properties, U. S. I. is giving about 22,000 shares of National Distillers common stock which it holds in its investment portfolio worth at present prices approximately $440,000.

It is planned to expand sales of the resin company on a nationwide basis and eventually to increase plant capacity.

Development of the chemical division of U. S. I.'s business is being pushed and chemical products now comprise about 38% of gross income against about 15% 7 years ago. Eventually it is hoped that about 75% of income will come from chemicals.

Acquires Actisec Process

Acticarbone Corp., 60 E. 42 st., N. Y. City, acquires exclusive rights for the North American continent to the Actisec process of dehydration by adsorption. This process, exclusively used in Europe during the past few years, was developed by the French Acticarbone Corp., and is controlled by the Acticarbone group. Patents have been applied for and granted in principal countries. Process is said to find use in numerous fields, from air conditioning in the home to the manufacture of food products and war gases.

C. S. C. Appoints Bacigalupi

E. W. Bacigalupi has been appointed manager of the western sales division of Commercial Solvents. Mr. Bacigalupi comes to this post with a decade of experience in serving the solvents and alcohol trade on the Pacific Coast.

New Ethyl Acetate Denaturants

New optional formulas have been approved for the denaturing of ethyl acetate by the Bureau of Internal Revenue.

Sulphur
Service

Sulphur.....Millions of Tons!

To those unfamiliar with the many uses of sulphur, the quantity stored in the huge stock piles or vats at the Texas Gulf mines would seem to be sufficient to last for years. As a matter of fact, one of these stock piles lasts but a short time so great is the demand for this essential, pure raw material.

But there are other vats untouched • • • there are still others in the making, more than 3000 tons daily being "mined".

With ample stocks above ground, with reserves still untapped, with adequate plant equipment • • • Texas Gulf is in a position to serve industry year after year regardless of demands for this 99½% pure raw material.

TEXAS GULF SULPHUR CO.
75 E. 45th Street New York City
Mines: Newgulf and Long Point, Texas

Improved Demand for Mixed Fertilizers

Finished Goods Price Structure Firmer—Ammoniates Again Decline—Superphosphate Reduced 50c—Potashes Quiet—First Quarter Fertilizer Tag Sales Off 9% in the South—Exports Up, Imports Down in February—March Superphosphate Up Slightly from February Total—

Movement of mixed goods in the South has been somewhat better than the trade anticipated, with the result that prices have shown firmer tendencies. The active season in the North is also opening up nicely. The fact that mixers have been extremely cautious in their purchasing of raw materials has also been an important factor in lending firmness to the price structure.

Raw materials are being taken in by mixers in fair volume, but the total is well below the tonnages which changed hands at this time last year. Some resale sulfate of ammonia is reported offered slightly below the market, but the tonnage available from second hands is not large. Feeling in the trade is that a possible shortage will develop sometime over the next few months due to the sharply curtailed activity in the steel industry. Shortage on the Pacific Coast is said to be noticeable already. Production from by-product coke for the first quarter totals 213,663,000 lbs., as compared with 410,302,000 lbs. in the corresponding period of last year. Imports for the July-February period have amounted to only 63,787 tons, as against 101,149 in the same months of '36-'37.

Practically all price revisions in April were on the downward side. The natural ammoniates were again weak and new lows were reached in nearly all instances. Superphosphate was reduced 50c a ton, the new prices being $8 for run of pile and $8.50 for 16% material. Bone materials were reduced in the face of little demand. Potashes were quiet and little interest was displayed in resale offerings.

Sales of tax tags in the 12 reporting Southern states in March represented 1,521,234 tons, which was the largest March tonnage since '30 with the exception of last year. The decline from last year was 13% but the March total was 9% larger than two years ago. North Carolina reported a slight increase over last year, and tonnage in Texas and Oklahoma was also larger this year. Declines from last year were shown by the other 9 states, with Georgia and South Carolina experiencing the sharpest recessions.

In the first quarter sales in the South were 9% smaller than in the first 3 months of '37. Sales were larger in Tennessee, Arkansas, Oklahoma, and Texas, and the declines in Virginia, North Carolina, Florida and Louisiana have been slight. In past years there has usually been a sharp drop in sales from March to April. In '32 and '33, when the season was delayed, April sales exceeded March, and in '36 the seasonal drop was relatively small. If trade reports about a late season this year prove to be correct April sales might prove somewhat better, relative to March, than has usually been the case. March sales in the Midwest were substantially lower than last year, with Kentucky the only one of the 5 states to show an increase. For the first quarter sales were off 14%, despite the fact that the volume in January and February was in each case ahead of '37 figures.

Exports of fertilizers and fertilizer materials in February totaled 122,456 short tons with a value of $1,196,777. Tonnage was 84% larger than in February, '37 and value was 55% greater. Increase over last year was due largely to a sharp rise in exports of rock. Totaling 159,506 short tons valued at $3,167,603, February imports were 39% less in volume and 39% less in value than in February of last year. There was a sharp drop in the tonnage of nitrogenous materials brought in, particularly in sodium nitrate and ammonium sulfate. Total imports of potash salts also fell off markedly, but this was due largely to a decline in nitrate of potash. For the first 8 months of the current fiscal year, July through February, total imports exceeded the corresponding period of last year by 7% and two years ago by 31%.

March superphosphate production was slightly higher than in February, in contrast to a usual seasonal decline at this season. Output was 30% less than in March of last year, however, with a particularly sharp drop occurring in the Southern area. Shipments held up somewhat better in March than did production. Stocks of superphosphate in base and mixed goods in consequence showed a somewhat greater than seasonal decline from February, and when adjusted for seasonal variation were the smallest since last May. The 150,000 ton drop in stocks of bulk superphosphate, however, was about in line with the usual seasonal change. At the close of March stocks of bulk superphosphate were 38% larger than a year earlier in the Northern area, but stocks at Southern points were only 22% larger.

Sulfuric acid production by fertilizer manufacturers in February totaled 159,659 tons, as against 183,794 tons in January and 152,860 tons in February of '37. Consumption in February amounted to 125,294 tons, as compared with 147,443 in January and 164,880 in February of last year.

Agricultural Chemicals

Important Price Changes

ADVANCED

	Apr. 30	Mar. 31
None.		

DECLINED

Blood, dom., Chgo.	$2.80	$2.90
N. Y.	2.70	2.85
Bone, imp., 4½ and 50	27.00	28.00
Bone meal, 3 and 50	17.00	18.00
Imported	21.00	22.00
Steamed	16.00	17.00
Castor pomace	20.00	21.00
Fish meal, Balt.	50.00	52.00
Fish scrap, Jap.	44.50	45.00
Superphosphate:		
Run of pile	8.00	8.50
16%	8.50	9.00
Tankage, Chgo.	2.45	2.50
N. Y., grd.	2.50	2.75

Dates of Important Meetings

Annual meeting of the National Fertilizer Association will be held as usual at the Greenbrier Hotel, White Sulphur Springs, W. Va., June 6-8. First International Fertilizer Congress will be held in Rome on Oct. 3-6.

Deaths of the Month

Mrs. Horace Bowker, wife of Horace Bowker, on April 20. . . David H. Scott, president, East Coast Fertilizer, Wilmington, N. C., suddenly on April 19 of a heart attack. . . E. J. Koos, president of the company bearing his name, on April 4 at his home at Kenosha, Wis.

Phosphate Message

The fertilizer industry is wondering what has happened to the greatly heralded presidential message on phosphate which was to be sent to Congress several weeks ago. One story in circulation is that the message has been lost somewhere in the White House. Another story is that Idaho interests, who want to develop the Snake River for reclamation and power, feel that bringing in power from Bonneville and Grand Coulee for electrochemical developments will lessen the chances for their own project. There is also a sharp division of opinion among the advocates of the development of the western beds as to the best method of production.

Less for Chemurgic Research

Appropriations committee of the house has reduced by 75% the Dept. of Agriculture appropriations bill allotment for the purpose of establishing 4 regional laboratories for the development of industrial products from farm crops. New farm act authorizes an appropriation of $4,000,000 for purpose; house committee reduced this item to $1,000,000 on April 14.

*Ken

*TO BE COGNIZANT OF - THE INSIDE STORY

Every alert buyer should know the inside story on Starkie products. How they can solve your manufacturing problems; the new applications for our pure synthetic pitch; the increasing demand for our complete line of electric rubber-covered, weatherproof, and code wire compounds and saturants—all passing standard specifications.

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A Pure Synthetic Pitch
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A. E. STARKIE COMPANY
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STARKIE

Fats and Oils

Chinawood Stages Modest Recovery

Slightly Better Demand Reported for Paint Oils—General Fats and Oils Price Structure Declined Further in April—Stocks of Vegetable Oils Continued to Accumulate During First Quarter—Flaxseed Statistics Show Drop in Crushings—Domestic Production of Tung Oil Estimated at 4,000,000 lbs.

The oils and fats market was largely featured by a modest recovery in Chinawood, the first upward price movement in this item in several months. Firmer prices were reported by cable from Hong Kong and this gave support to the market in this country. Paint manufacturers in the past 60 days have taken in a fair amount of the oil that they have been committed for for several months, thus easing the pressures on importers. Diversity of opinion existed as to the actual causes for the strengthening of the price structure, and probably all of the reasons advanced were in a measure responsible. Better paint manufacturing operations, a brighter outlook in the building industry over the next 6 months, and possibly some difficulty in getting oil out of China, were a few of the contributory causes. Oiticica moved up slightly with the advance in Chinawood, but perilla lost ground during the month. At the close of the month some of the gain in Chinawood was lost when the situation turned more competitive.

The general movement in prices last month, however, was in the downward direction, carrying most of the principal oils and fats to new lows for the year. Corn was weak when the grain market again sagged; linseed failed to rally with Chinawood; the fish oils again lost ground when it became increasingly evident that the former scarcity no longer prevailed and current stocks were more than ample for present requirements. Soapers were not very active in the market last month, but considerable tonnages of vegetable oils were said to have been bought for foreign accounts. The principal animal oils and fats were lower in the past month although a firm market prevailed for lard.

Flaxseed, Linseed in First Quarter

Director of the Census, William L. Austin, announces that, according to preliminary figures, there were 22 mills which crushed flaxseed during the quarter ending March 31, reporting a crush of 180,918 tons of flaxseed and a production of 125,587,390 lbs. of linseed oil. These figures compare with 228,904 tons of seed crushed and 156,877,263 lbs. of oil produced for the corresponding quarter in '37; 198,642 tons of seed and 132,136,919 lbs. of oil in '36; 161,116 tons of seed and 111,822,663 lbs. of oil in '35; 144,365 tons of seed and 97,451,809 lbs. of oil in '34; and 122,230 tons of seed and 79,595,129 lbs. of oil in '33.

Stocks of flaxseed at the mills on March 31, amounted to 59,971 tons compared with 85,340 tons for the same date in '37, with 68,149 tons in '36, with 58,629 tons in '35, with 57,437 tons in '34, and with 46,101 tons in '33. Stocks of linseed oil reported by the crushers were 184,165,644 lbs. on March 31, compared with 93,395,673 lbs. for the same date in '37, with 149,030,984 lbs. in '36, with 87,514,223 lbs. in '35, with 124,298,742 lbs. in '34, and with 110,454,878 lbs. in '33.

Chinawood Shipments Rise

Shipments of Chinawood oil from Hangkow in March at 5,370 tons were larger than some had expected, being over 1,000 tons in excess of the February movement, current issue of the *Tung Oil Monthly* reports.

Shipments designated as for export to the U. S. were 2,400 tons, as compared with 2,556 tons in February. However, the bulk of the oil shipped to Hong Kong is believed to have been intended mainly for export to this country. This oil amounted to 2,388 tons, as contrasted with 1,488 tons in February. Total movement was 5,370 tons while in February it was 4,107 tons, March, 1937, 6,973 tons and March, 1936, it was 6,368 tons.

Stocks at Hangkow still remain substantial at 6,500 tons. This is a decline from the 8,000-ton figure at the end of February and 8,500 tons at the end of January, but considerably larger than in 1937 and 1936 when the totals were 560 and 510 tons. Comparisons with previous years, of course, may be misleading since much oil then was held at Shanghai and the usual tendency was to move oil rapidly down to the seaport.

Stocks Accumulate in 1st Quarter

Stocks of vegetable oils accumulated in most instances during the past quarter while consumption of the paint and some other non-edible oils fell sharply below the comparable '37 level, quarterly report by the Bureau of Census shows, according to a survey by *The N. Y. Journal of Commerce*.

Generally, paint oil stocks were much higher than last year. Chinawood and perilla consumption were reduced 40% from a year ago while stocks gained about 45 and 140%, respectively. Imports were 4 times as large in the case of perilla but off nearly 40% for tung.

Inedible olive oil and sulfur olive oil foots consumption were reduced to one-half or less while stocks were reduced about 40%. Castor oil consumption was reduced by one-third while stocks gained by a similar amount.

Important Price Changes

	Apr. 30	Mar. 31
ADVANCED		
Chinawood, drs.	$0.12½	$0.11¾
Tks.	.116	.11
Oiticica, bbls.	.10½	.10⅜
Palm kernel, bulk	.0415	.04
DECLINED		
Coconut, Manila, crude, tks.	$0.03⅜	$0.03½
Corn, crude, tks.	.07	.07⅜
Linseed, boiled, tks.	.091	.093
Raw, tks.	.087	.089
Menhaden:		
Ref'd alkali, tks.	.081	.087
Blown, drs.	.087	.093
Kettle-bodied, drs.	.097	.103
Light-pressed, tks.	.074	.08
Olive oil foots, bbls.	.08¼	.08¾
Palm niger, casks	.036	.04
Sumatra, bulk	.03	.03½
Perilla, tks.	.098	.10
Sardine, crude, tks.	.38	.46
Ref'd alkali, tks.	.081	.085
Light-pressed, tks.	.074	.078
Soybean, crude, tks.	.065	.073

Soap Oils Affected Last Quarter

Apparently the soap oils consumption also was adversely affected last quarter since tallow consumption dropped so sharply. It may be assumed that edible demand for palm and coconut oils tended to hold up consumption of these two oils, although some substitution of these oils for tallow might have occurred. Stocks of tallow also increased.

Another change was the decline in consumption of fish oils. This fell from 61,733,538 lbs. in January-March, 1937, to 28,586,966 in the past quarter, so that even with the much smaller catch, stocks were off only 32,000,000 lbs. Whale oil consumption also declined by 50%.

Estimates Domestic Crop

The '38 tung nut crop in the U. S. will be in the neighborhood of 20,000,000 lbs., the Commerce Department estimated on April 8. This would amount to 4,000,000 lbs. of oil, or somewhat less than 5% of the annual U. S. requirements.

Asks Excise Tax Repeal

The Philippines Assembly on April 9 unanimously passed a resolution asking Congress to repeal the coconut oil excise tax or alternatively repeal prohibition of payment of subsidies to the excise tax fund of the coconut industries.

More Detailed Oil Statistics?

The House of Representatives on April 14 passed H.R. 9659, directing the Bureau of the Census to collect and publish detailed monthly reports on vegetable oils. Bill now goes to the Senate. The proposed measure also would give more power to the Bureau to collect additional statistical data from other fields.

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RAW MATERIALS
of Botanical Origin
For The CHEMICAL INDUSTRIES

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- **Large stocks at all times**
- **Centrally located plants**
- **Wide physical resources and equipment**
- **Extensive milling facilities for producing any fineness desired**
- **Prompt shipment**
- **Lowest market prices**

ACACIA GUM (Gum Arabic)
AGAR AGAR (Japanese Gelatin)
ALTHEA ROOT
ARGOLS, Powdered
BALSAMS, Oregon and Canada
BIRCH BARK
BURGUNDY PITCH, Imported
CATECHU GUM (Cut)
COCHINEAL
DRAGON'S BLOOD
GHATTY GUM
GUAIAC GUM
IRISH MOSS
ISINGLASS
KARAYA GUM (Indian Gum)
LOCUST BEAN Powder
LYCOPODIUM
MASTIC GUM
ORRIS ROOT
PAPAIN (Vegetable Enzyme)
ROSIN Powder
SANDARAC GUM
SAPONINE
SOAP BARK (Quillaya)
SOAP POWDER (Castile and Neutral)
TAHLA GUM
TRAGACANTH GUM (all grades)
VENICE TURPENTINE

All qualities under laboratory control.

S. B. PENICK & COMPANY

132 NASSAU STREET, NEW YORK **1228 W. KINZIE STREET, CHICAGO**

THE WORLD'S LARGEST BOTANICAL DRUG HOUSE

Irregular Demand for Raw Materials Reported

Break in Egg Albumen and Egg Yolk Prices—Natural Dyestuffs Quiet—Carnauba Wax Competitive—Little Interest in Shellac—Mixed Movement in Naval Stores—Turpentine Sinks to 23c, Lowest Price in Over 40 Years—Woburn Degreasing Offers Plan for Growing and Utilizing Castor Beans—

Despite continued dullness in the general business situation and the decided tendency for wholesale commodity prices to drop further, the markets for raw materials presented a very firm price front. Purchasing in most items was light, with buyers still clinging to a cautious attitude in regard to forward commitments. Dealers in imported items are not generally overstocked and hence are not anxious to unload present holdings unless they obtain what they feel are satisfactory prices considering the present uncertain state of business activity. In some cases cables from abroad are indicating to the trade a stiffening tendency on the part of sources of supply at primary points. The logic in back of this is that it is felt that substantial recovery will take place in business shortly after the summer period.

Highly competitive conditions are responsible for the wide break in certain grades of egg albumen and egg yolk. Stocks are heavy, hence the desire to move larger tonnages into consuming channels. A ½c increase was placed in effect on potato starch; a ½c decline was announced for sago flour; rice starch was off 1c; a 50c reduction was made in ground Italian sumac; and a $1 drop was noted in valonia beards.

Natural dyestuffs were quiet, but firm price tendencies were in evidence in annatto, logwood, and fustic. Myrobalans J1 was advanced $1.50 a ton early in the month, but the increase was cancelled out by a similar reduction later in the period. The sharp decline in the more important natural varnish gums is commented on in the Pigments and Fillers page of this issue.

Price Concessions in Carnauba

The market for waxes in the past month was an exceptionally quiet one. Shading of carnauba prices continued as dealers actively competed for the restricted amount of business available. Stocks are ample and there is a distinct tendency on the part of importers to offer material at concessions if they feel that worthwhile tonnages can be moved. The call for the various grades of beeswax was small. Candelilla prices are being well maintained because of the rigid control at the primary source, but there is very little snap to the trading. Spot inquiries for Japan are few and far between. Prices are now close to actual replacement figures, hence dealers are said to be unwilling to make any appreciable concessions from quoted prices.

Shellac is still in the doldrums. The larger consumers apparently are well stocked considering the low state of manufacturing activity at the moment. Prices were generally held at published levels, and additional firmness may be supplied by the fact that a large shipment was lost when the *City of Salisbury* foundered on a rock in Boston harbor.

Naval Stores Factors More Cheerful

Movement of naval stores into consumers' hands was slow in the past 30 days. A slightly more optimistic tone was in evidence in the primary ports based largely on the fact that the government loan program is now said to be actively functioning, which will undoubtedly lead to larger withdrawals and less pressure on prices. Turpentine lost a cent during the past month and currently is at the lowest level in the memory of most of those in active trading. Prices on rosin fluctuated within rather narrow limits and a few gains and some declines were made when comparison of end-of-the-month prices is made. The net changes are shown in the following comparison of the Savannah market:

	April 29	April 1	Net Gain or Loss
B	$3.40	$3.50	—$0.10
D	3.75	3.75	.....
E	3.80	3.80	.....
F	4.25	4.70	—.45
G	4.65	4.70	—.05
H	4.70	4.70	.....
I	4.70	4.70	.....
K	4.72½	4.70	+.02½
M	4.72½	4.70	+.02½
N	5.15	5.15	.....
WG	5.90	5.85	+.05
WW	6.30	6.50	—.20
X	6.30	6.50	—.20
Turpentine	23c	24c	— 1c

In New Location

Bridges, Neumer & Co., N. Y. City, a leading importer specializing in dried egg products, menthol and egg products, moves from the Cities Service Bldg. to 82 Wall st. The firm is headed by Arthur E. Neumer.

Fritz (Goodrich) Promoted

Announcement of a new division to handle the sale of rubber-like materials and synthetics to be headed by Dr. H. E. Fritz, has been made by W. S. Richardson, mechanical rubber merchandising manager of B. F. Goodrich, Akron, Ohio.

Dr. Fritz, identified with the Goodrich company for more than 13 years, has been in charge of the sale and development of Koroseal, a rubber-like synthetic material which is now being used in a number of industries.

Natural Raw Materials

Important Price Changes

	Apr. 30	Mar. 31
ADVANCED		
Starch, potato	$0.04	$0.03½
DECLINED		
Albumen, egg, ed., cryst.	$0.80	$0.83
Dom., ed. powd.	.85	.88
Egg yolk	.60	.63
Sago flour	.02½	.02¾
Starch, rice	.06¼	.07¼
Sumac, grd., Sicilian	64.00	64.50
Valonia beards	49.00	50.00

To Develop Castor Bean Uses

After 4 years of intensive study and experimental work, Woburn Degreasing Co., Harrison, N. J., is offering a working plan for the agricultural development of the castor plant and the industrial uses of the bean, the oil, the pomace, and the cellulose of the castor plant, also the insecticidal constituent of the plant's leaves. Certain of these proposed uses were disclosed briefly by William W. Buffum, treasurer of the Chemical Foundation at the annual meeting of the Synthetic Organic Chemical Manufacturers Association on Dec. 20 (see C. I., Jan., '38, p. 65). Woburn plan has been presented by Woburn Industries Farm Bureau, a unit of the Woburn company, in a report prepared by M. D. L. Van Over, director of the bureau, submitted to American agriculture by A. G. H. Reimold, president of Woburn Degreasing.

To promote the Woburn plan the Agricultural Chemical Association has been formed in Washington. Former Senator Smith W. Brookhart is one of the active organizers of new association. Woburn Degreasing has prepared copies of Mr. Van Over's report. Requests should be made directly to company, Harrison, N. J.

Cheaper Mineral Processes

Information which should be of great practical value in simplifying and cheapening the production of many of the nonmetallic or "industrial" minerals used in the manufacture of numerous commercial products has been developed by the Bureau of Mines, U. S. Dept. of the Interior, as the result of extended studies of the flotation and agglomerate concentration of these minerals. Among the minerals studied are phosphate rock, barite, magnesite, calcium and strontium. Results of the investigation are summarized in a paper by O. C. Ralston, chief engineer, Nonmetals Division, just published by the Bureau of Mines. Copies designated as Report of Investigations 3397, "Flotation and Agglomerate Concentration of Nonmetallic Minerals," may be obtained from the Bureau of Mines, Washington, D. C.

Pigments and Fillers

Important Price Changes

ADVANCED

	Apr. 30	Mar. 31
Calcium sulfide, luminous	$0.85	$0.75

DECLINED

Antimony, white pigment	$0.11½	$0.12½
Casein 20-30	.06½	.07½
80-100	.07	.08
Ethyl cellulose	.6440	.6515
Putty, commercial	2.50	2.90
Linseed grade	4.00	4.65

Cornish Dies Suddenly

Edward Joel Cornish, 76, chairman of the board of National Lead, died on May 3 of a heart attack. He was found by his secretary. He suffered a stroke two years ago, but had sufficiently recovered to return to his duties. Mr. Cornish was an attorney for years.

Retiring from general law practice in 1900, Mr. Cornish continued as counsel for the Levi Carter estate, and in 1903 he was elected president of Carter Lead. He continued to hold the office after the sale of the capital stock to National Lead in 1906. Two years later he became a director of National Lead and was appointed manager of the Chicago branch.

In 1910, Mr. Cornish was transferred to N. Y. City as a vice president of National Lead and a member of its executive committee. Elected president in 1916, he remained the chief executive officer for 17 years, retiring to the board chairmanship in '33.

Nat. Lead Personnel Changes

Henry G. Sidford, manager Atlantic branch of National Lead, and Harold Rowe, who held the post of assistant to the president, were elected vice-presidents at the annual meeting of the board of directors, April 21. Mr. Rowe was also elected a director to succeed O. H. Greene of St. Louis, who resigned, and was also elected to membership on the executive committee. Mr. Sidford has been a director of the company since '25.

E. F. Beale, president, John T. Lewis & Bros. Co., a National Lead unit of Philadelphia, and W. C. Beschorman, executive vice-president, retired as vice-presidents and, together with Dr. Gustave W. Thompson, chief chemist, retired as members of the executive committee. Dr. Thompson also retired as chief chemist. All National Lead employees must retire on reaching 70 years of age.

M. Douglas Cole, former secretary, is now assistant to the president, and H. O. Bates was appointed secretary. R. L. Hallett is chief chemist. Alex Stewart is director of research and assistant manager of the laboratory.

Paint Volume is Disappointing

April Sales of Raw Materials Better Than March Figures, But the Season Has Failed to Come Up to Earlier Expectations—Varnish Gums Sharply Reduced—Casein Again Goes Lower as Stocks Accumulate—Luminous Calcium Sulfide Advanced 10c—Lead and Zinc Pigments Hold at Previous Price Levels—

While April volume of raw paint materials was decidedly better than that for March the current season has been a most disappointing one. Paint manufacturers came into the market last month for replacement of depleted stocks, but their buying was of an extremely cautious nature. They have shown great hesitancy about building up dealers' stocks because of the credit situation and because demand for paint and allied products has been highly irregular. Industrial sales have suffered severely from the curtailment in automotive production, while building operations have not opened up in a way to warrant paint producers in manufacturing ahead in large volume.

Despite the relatively poor showing in the raw paint field prices generally have held up firmly. The one exception was in the case of the varnish gums where widespread reductions were announced. The Batavia gums led in the general decline, but even at the more attractive price levels little buying interest was in evidence. A one cent decline was made in antimony white pigment, the first price change in this item for a long period. Prices for the 3 grades vary between 11½c and 14½c, f.o.b. producing point, with a freight allowance up to ½c, depending upon grade and quantity. Casein again moved lower, continuing the long period of decline. Stocks are larger, while the demand shows little if any improvement. On the up side of the market the only important advance was one of 10c per lb. on luminous calcium sulfide, bringing the new level to 85c in sizable quantities. No price revisions were made in the lead or zinc pigments during the past month, although both lead and zinc worked lower in price.

Building figures for March were slightly encouraging, at least showing a trend upward. The F. W. Dodge report for March covering 37 states showed a gain of 91% over February which is far greater than the usual seasonal increase from February to March. March total was $226,918,000, as compared with $118,945,000 for February and with $231,246,000 in March a year ago. The next few months are expected to show the stimulus of new federal aid, and if the President's plans for spending an additional $5,000,000 in "pump-priming" are passed by Congress a sizable increase in public works will appear in due course.

March stocks of slab zinc increased 9,871 tons to 118,000 tons, according to the American Zinc Institute, the highest since the end of '34. In the same period lead stocks increased 5,377 tons, the highest point since February of '37. Compared with other metals such as copper and zinc, the increase in lead stocks has been mild.

Seek Specification Approval

A new Federal specification for damar varnish has been prepared by the technical committee on paint of the Federal Specifications Executive Committee, National Bureau of Standards. This has been submitted to individual manufacturers and to the Federation of Paint and Varnish Production Clubs, the National Paint, Varnish and Lacquer Association, and the American Gum Importers Association, with the request that comments be submitted to the committee by May 18. Copies may be had from the National Bureau of Standards, Washington, D. C.

Waldo Seeks Reorganization

E. M. & F. Waldo, Inc., raw paint materials, Muirkirk, Md., has applied for permission to reorganize under section 77B of the Bankruptcy Act. Corporation was ordered to file its reorganization plan on or before May 1 and a hearing to consider the plan will be held before June 1. Permission to continue has been granted the corporation.

Approve Jones-Dabney Deal

Devoe & Raynolds' stockholders on April 29 voted approval of the plan to take over Jones-Dabney, Louisville, Ky. Devoe & Raynolds will issue 28,000 shares of its A stock for 14,900 shares of Jones-Dabney capital stock.

Smith Recovering Slowly

Casper Smith, president, Smith Chemical & Color, Brooklyn, has returned to his home from the Hospital for Joint Diseases, Manhattan. He was severely injured in an automobile accident and will be confined to his home for at least a month.

Personnel

Edward F. Maloney has been elected vice-president and a director of Atlantic Research Associates, Newtonville, Mass. Mr. Maloney, who joined the organization Jan. 1 as manager of the paint and pigment division, will succeed A. A. Stickler as vice-president. Mr. Stickler will remain as a director of Atlantic Associates as well as treasurer of the parent company, National Dairy Products. Atlantic Research Associates is marketing special paint extender pigments.

Chemical Common Stocks Rose in April

Modest Gains are Reported—Trading on the N. Y. Stock Exchange Lowest Since '21—First Quarter Earnings Show Drastic Drop from '37 Figures—du Pont Reports 65c Against $1.34 for First Period of '37—Cyanamid Nets $94,077, or 3c a Share—

The downward sweep of the stock market was halted in the past month and modest gains were registered in most instances. The advance was somewhat surprising in the face of the halting manner in which business activity continues. Gains in the chemical stocks reflected the general feeling in the market that this group would again lead the business recovery.

The April upturn took place despite light trading. In fact the volume of 17,119,534 shares was the smallest for any corresponding month since 1921. Dividends declared were the smallest in dollar volume since April, 1935, and totaled but $960,207,810, against $1,144,427,656 in the same month of last year.

Reports for the first quarter of the leading chemical companies make sorry reading when net earnings for the first 3 months are compared with the corresponding period of '37. There are reasons to believe, however, that the second quarter will show up slightly better, but there is no hope that the figures for the second quarter of '37 will be reached. While business has definitely improved for most chemical companies, the volume is still well below that of a year ago at this time while production costs and labor costs have in most cases risen to higher levels.

Du Pont Nets $9,060,602

Du Pont and wholly owned subsidiaries in the quarterly statement for the period ended on Mar. 31, reported net income of $9,060,602, subject to year-end adjustments, after depreciation, obsolescence, interest and Federal income taxes and provision for surtax on undistributed profits, compared with $16,013,346 for the similar quarter in '37.

After deduction of debenture dividends and dividends on the $4.50 preferred stock and inclusion of $317,865 of company's proportion of undivided profits of controlled companies not wholly owned, balance available for common was $7,176,571, equal to 65c a share on 11,037,947 average number of common shares outstanding during the quarter. These earnings include the dividend from General Motors representing the du Pont investment in that company amounting to 22c a share on du Pont common.

Balance available for common stock in the first quarter of '37, including $432,522 of the company's proportion of undivided profits of controlled companies not consolidated, amounted to $14,806,572, equivalent to $1.34 a share on 11,047,838 average number of common shares outstanding. Earnings for the first quarter of '37 included dividends from G. M. of 22c a share on du Pont common.

From 54c to 3c a Share

Report of American Cyanamid and subsidiaries for quarter, subject to audit and year-end adjustments, shows net income of $94,077 after depreciation, depletion, research and process development expenses, interest, amortization, federal income taxes, minority interest, etc., equivalent after deducting $12,760 dividends accrued on preferred stock, to 3c a share on 2,520,368 shares (par $10) of combined Class A and Class B common stocks outstanding at end of period, excluding shares held by subsidiaries. This compares with $1,364,640 or 54c a share on combined shares in March quarter of '37.

Westvaco Earnings Hold up Well

Westvaco Chlorine and subsidiaries for quarter, subject to audit, shows net profit of $173,837 after depreciation and federal income taxes, but before surtax on undistributed profits, equivalent, after dividend requirements on 5% convertible preferred stock, to 30c a share on 339,362 no-par shares of common stock. This compares with $221,874, or 44c a share, on common in March quarter of previous year.

Atlas Reports 52c

Report of Atlas Powder and subsidiaries for quarter, shows net profit of $216,506 after depreciation, federal income taxes, etc., equivalent after preferred dividends paid, to 52c a share on 249,151 no par shares of common stock, excluding shares held by company. This compares with $361,081 or $1.10 a share on 250,032 common shares in March quarter of '37.

Hercules Profits Off Sharply

Hercules Powder reports for first quarter net earnings of $656,027 after providing for depreciation and Federal taxes. This is equal, after payment of preferred dividends, to 40c a share on an average of 1,316,710 shares of common stock outstanding. Figures for the first quarter of '37 showed net earnings of $1,475,590, equal, after payment of preferred dividends, to $2.29 a common share on an average of 585,948 shares then outstanding. Current assets, as shown at the quarter end, amount to $20,731,727. This represents a 10.3 ratio to current liabilities. Cash and marketable securities amount to $8,768,369.

Wall St. Notes

Additional Quarterly Reports

Commercial Solvents reports for quarter ended Mar. 31, consolidated net loss of $236,500 after taxes and depreciation. This compares with net profit of $501,773, equivalent to 19c a share on 2,636,878 no-par shares of capital stock in March quarter of '37.

Catalin Reports

Catalin Corp. of America reports for quarter loss of $1,042 after depreciation, etc., but before federal taxes, comparing with profit of $85,012 before federal taxes in March quarter of previous year.

Mathieson Nets $172,400

Mathieson Alkali reports for quarter ended Mar. 31, net profit of $172,400 after depreciation, depletion, federal income and undistributed profits taxes, etc., equivalent after dividend requirements on 7% preferred stock, to 16c a share on 828,181 no-par shares of common stock. This compares with $477,051 or 52c a share on 830,428 common shares in March quarter of previous year.

Dow Earns $3,044,258 in 9 Months

Dow's consolidated unaudited earning statement shows earnings for the 9 months ended Feb. 28, '38, of $3,044,258, after interest, depreciation and income tax equal after preferred stock dividend requirements to $3.10 per share of common. No allowance was made for possible surtax on undistributed profits. W. H. Dow, president, estimated that based on present sales the company would earn approximately $1 per share in the final quarter.

A. A. C. Nine Months' Report

Report of American Agricultural Chemical (of Delaware) and subsidiaries for 9 months ended Mar. 31, shows net profit of $427,390 after federal income taxes, depreciation, depletion, reserve for self-insurance, etc., equivalent to $2.04 a share on 209,431 no-par shares of capital stock. No provision was made for federal surtax on undistributed profits. This compares with $665,421 or $3.15 a share on 210,933 shares for 9 months ended Apr. 1, '37. For quarter ended Mar. 31, last, indicated net profit, based on a comparison of company's reports for the 6 and 9 months' periods, was $294,743 equal to $1.41 a share on 209,431 shares, comparing with $112,194 or 53c a share on 210,931 shares in preceding quarter and $503,727 or $2.39 a share on 210,933 shares in quarter ended Apr. 1, '37.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1937 Average $1.10 - Jan. 1937 $1.11 - April 1938 $1.23

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Acetaldehyde, drs, c-l, wks	lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks	lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs	lb.	.39	.43	.32	.43	.32	.43
Acetanalid, tech, 150 lb bbls	lb.	...	.32	.29	.32	.24	.29
Acetic Anhydride, drs, f.o.b. wks, frt all'd	lb.	.10½	.11	.10½	.11	.13	.15
Acetin, tech, drs	lb.	...	.33	...	.33	.22	.33
Acetone, tks, f.o.b. wks, frt all'd	lb.	...	.04¾	...	.04¾	.04¾	.06½
drs, c-l, f.o.b. wks, frt all'd	lb.	...	.05¾	...	.05¾	.05¾	.07½
Acetyl chloride, 100 lb cbys	lb.	.55	.68	.55	.68	.55	.68
ACIDS							
Abietic, kgs, bbls	lb.	.09¾	.10	.09¾	.10	.06¾	.10
Acetic, 28%, 400 lb bbls, c-l, wks	100 lbs.	...	2.23	...	2.23	2.23	2.53
glacial, bbls, c-l, wks	100 lbs.	...	7.62	...	7.62	7.62	8.70
glacial, USP, bbls, c-l, wks	100 lbs.	...	10.25	...	10.25	10.50	12.43
Acetylsalicylic, USP, 225 lb bbls	lb.	...	.60	...	.60	.50	.60
Adipic, kgs bbls	lb.	...	.72	...	.72	...	.72
Anthranilic, ref'd, bbls	lb.	1.15	1.20	1.15	1.20	.85	1.00
tech, bbls	lb.	...	.75	...	.75	...	.75
Battery, cbys, wks	100 lbs.	1.60	2.55	1.60	2.55	1.35	2.60
Benzoic, tech, 100 lb kgs	lb.	.43	.47	.43	.47	.43	.47
USP, 100 lb kgs	lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv	ton *a*	...	95.00	...	95.00	...	95.00
Broenner's, bbls	lb.	...	1.11	...	1.11	...	1.11
Butyric, edible, c-l, wks, cbys	lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks	lb.	...	.22	...	.22	...	.22
wks, lcl	lb.	...	.23	...	.23	...	.23
tks, wks	lb.	...	.21	...	.21	...	.21
Camphoric, drs	lb.	5.50	5.70	5.50	5.70	5.50	5.70
Chicago, bbls	lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks	lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv	lb.	.15¼	.17¼	.15¼	.17¼	.15¼	.16¾
Citric, USP, crys, 230 lb bbls	lb. *b*	.24	.25	.24	.25	.24	.26
anhyd, gran, bbls	lb. *b*	...	.26½	...	.26½	.26½	.29
Cleve's, 250 lb bbls	lb.	.50	.52	.50	.52	.50	.52
Cresylic, 99%, straw, HB, drs, wks, frt equal	gal.	.79	.81	.79	.91	.72	.91
99%, straw, LB, drs, wks, frt equal	gal.	.87	.89	.87	.94	.77	.94
resin grade, drs, wks, frt equal	lb.	.10¼	.10¾	.10¼	.11¼	.09	.11¼
Crotonic, bbls, delv	lb.	.21	.50	.21	1.00	.75	1.00
Formic, tech, 140 lb drs	lb.	.10½	.11½	.10½	.11½	.10½	.13
Fumaric, bbls	lb.	...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)							
Gallic, tech, bbls	lb.	.75	.79	.75	.79	.65	.75
USP, bbls	lb.	.87	.91	.87	.91	.77	.91
Gamma, 225 lb bbls, wks	lb.	...	.85	...	.85	...	.85
H, 225 lb bbls, wks	lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 10% sol, cbys	lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 34% conct 155 lb cbys, wks	lb.	.42	.44	.42	.44	.40	.42
Hydrochloric, see muriatic							
Hydrocyanic, cyl, wks	lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks	lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks	lb.	.10½	.15	.10½	.15	.10½	.15
Lactic, 22%, dark, 500 lb bbls	lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
22%, light ref'd, bbls	lb.	.03½	.03¾	.03½	.03¾	.03½	.03¾
44%, light, 500 lb bbls	lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
44%, dark, 500 lb bbls	lb.	.06½	.06¾	.06½	.06¾	.06½	.06¾
50%, water white, 500 lb bbls	lb.	.10½	.11½	.10½	.11½	.10½	.11½
USP X, 85%, cbys	lb.	.42	.45	.42	.45	.42	.50
Lauric, drs	lb.	.08½	.09	.08½	.09	...	...
Laurent's, 250 lb bbls	lb.	.45	.46	.45	.46	.45	.46
Levulinic, 5 lb bot, wks	lb.	...	2.00	...	2.00	...	...
Linoleic, bbls	lb.	...	.20	...	.20	.16	.20
Maleic, powd, kgs	lb.	.30	.40	.30	.40	.29	.40
Malic, powd, kgs	lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls	lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks	N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
	S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls	lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls	lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks	100 lb.	...	1.50	...	1.50	1.35	1.50
tks, wks	100 lb.	...	1.00	...	1.00	...	1.00
20°, cbys, c-l, wks	100 lb.	...	1.75	...	1.75	1.45	1.75
tks, wks	100 lb.	...	1.10	...	1.10	...	1.10
22°, c-l, cbys, wks	100 lb.	...	2.25	...	2.25	1.95	2.25
tks, wks	100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys	lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls	lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs	lb.	.10	.13	.10	.13	.10	.14
Sludges, drs	lb.	...	.05	...	.05	.05	.10
Naphthionic, tech, 250 lb bbls	lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks	100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks	100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks	100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks	100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv	lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N Y	lb.	.10¾	.12	.10¾	.12	.10¾	.12
Phosphoric, 85%, USP, cbys	lb.	.12	.14	.12	.14	.12	.14
50%, acid, c-l, drs, wks	lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks	lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks	lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks	lb.	.35	.40	.35	.40	.35	.40
Propionic, 98% wks, drs	lb.	...	.22	...	.22	.20	.22
80%	lb.	.16	.17½	.16	.17½	.16	.17½
Pyrogallic, tech, lump, pwd, bbls	lb.	...	1.05	...	1.05	...	...
cryst, USP	lb.	1.45	1.63	1.45	1.63	1.30	1.48
Ricinoleic, bbls	lb.	...	.35	.35	.38	.35	.38
tech, bbls	lb.	...	.13	...	.13	...	...
Salicylic, tech, 125 lb bbls, wks	lb.	...	.33	...	.33	...	.33
USP, bbls	lb.	.40	.45	.40	.45	...	...
Sebacic, tech, drs, wks	lb.	.37	.41	.37	.41	.37	.41
Succinic, bbls	lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks	lb.	.17	.18	.17	.18	.17	.18
Sulfuric, 60°, tks, wks	ton	...	13.00	...	13.00	12.00	13.00
c-l, cbys, wks	100 lb.	...	1.25	...	1.25	1.10	1.25
66°, tks, wks	ton	...	16.50	...	16.50	15.50	16.50
c-l, cbys, wks	100 lb.	...	1.50	...	1.50	1.35	1.50
CP, cbys, wks	lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks	ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls	lb.	.40	.47	.40	.47	.19	.47
Tartaric, USP, gran, powd, 300 lb bbls	lb.	.25¼	.25¾	.24¼	.25¾	.21¾	.25¼
Tobias, 250 lb bbls	lb.	.65	.67	.65	.67	.65	.67
Trichloroacetic bottles	lb.	2.00	2.50	2.00	2.50	2.00	2.50
kgs	lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls	lb.	no price					
Vanadic, drs, wks	lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls	lb.	.52	.60	.52	.60	.47	.60
dark, bbls	lb.	.13	.18	.11	.18	.11	.17
egg, edible	lb.	.80	.82	.80	1.15	.76	1.15
vegetable, edible	lb.	.74	.78	.74	.78	.76	.78
Alcohol, Amyl (from Pentane) tks, delv	lb.	...	.123	...	.123	...	.123
c-l, drs, delv	lb.	...	.133	...	.133	...	.133
lcl, drs, delv	lb.	...	.143	...	.143	...	.143
Amyl, secondary, tks, delv	lb.	...	.08½	...	.08½	...	.08½
drs, c-l, delv E. of Rockies	lb.	...	.09½	...	.09½	...	...
Benzyl, cans	lb.	.68	1.00	.68	1.00	.65	1.10
Butyl, normal, tks, f.o.b. wks, frt all'd	lb. *d*	...	.09	...	.09	.08½	.09
c-l, drs, f.o.b. wks, frt all'd	lb. *d*	...	.10	...	.10	.09½	.10
Butyl, secondary, tks, delv	lb. *d*	...	.06	...	.06	.06	.07
c-l, drs, delv	lb. *d*	...	.07	...	.07	.07	.08
Capryl, drs, tech, wks	lb.	...	.85	...	.85	...	.85
Cinnamic, bottles	lb.	2.00	2.50	2.00	2.50	2.00	3.65
Denatured, CD, No. 11, 12, 13, c-l, drs, wks	gal. *e*	...	.33	.33	.35	.33	.35
tks, East, wks	gal.	...	.27	.27	.29	...	...
Western schedule, c-l, drs, wks	gal. *e*	...	.26	.26	.28	.37	.39
Denatured, SD, No. 1, tks		...	.25	.25	.27	.26	.27
c-l, drs, wks	gal. *e*	...	.31	.31	.33	.32	.33

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.; *y* Price given is per gal.

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Alcohols (continued):					
Diacetone, pure, c-l, drs, delv lb. *f*	...	.11½	...	.11½	...	.11½
tech, contract, drs, c-l, delv lb.	...	.10½	...	.10½	...	...
Ethyl, 190 proof, molasses, tks gal. *g*	...	4.04	4.04	4.06	4.05	4.07
c-l, drs gal. *g*	...	4.10	4.10	4.12	4.11	4.12
c-l, bbls gal. *g*	...	4.11	4.11	4.13	4.12	4.13
absolute, drs gal. *g*	4.40	4.45	4.40	4.47	4.54	6.08½
Furfuryl, tech, 500 lb drs lb.	.30	.35	.30	.35	.30	.35
Hexyl, secondary tks, delv lb.	...	.12	...	.12	.11½	.12
c-l, drs, delv lb.	...	.13	...	.13	.12½	.13
Normal, drs, wks lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delv lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs lb.	...	.10	...	.10	...	.10
c-l, drs lb.	...	.09½	...	.09½	...	.09½
tks lb.	...	.08½	...	.08½	...	.08½
Isopropyl, ref'd, 91%, c-l, drs, f.o.b. wks, frt all'd lb.	...	.36	...	.36	.39½	.45
Ref'd 98%, drs. f.o.b. wks, frt all'd gal.	...	.41	...	.41	...	...
Tech 91%, drs, above terms gal.	...	.33½	...	.33½	...	...
tks, same terms gal.	...	.28½	...	.28½	...	...
Tech 98%, drs, above terms gal.	...	.37½	...	.37½	...	...
tks, above terms gal.	...	.32½	...	.32½	...	...
Spec Solvent, tks, wks gal.	...	.26	.26	.28	.27	.28
Aldehyde ammonia, 100 gal drs lb.	.80	.82	.80	.82	.80	.82
Aldehyde Bisulfite, bbls, delv lb.	...	.17	...	.17	...	...
Aldol, 95%, 55 and 110 gal drs, delv lb.	...	.20	...	.20	...	...
Alphanaphthol, crude, 300 lb bbls lb.	...	.52	...	.52	...	.52
Alphanaphthylamine, 350 lb bbls lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks 100 lb.	3.40	3.65	3.40	3.65	3.00	3.25
delv NY, Phila 100 lb.	...	3.40	...	3.40	3.15	3.40
Granular, c-l, bbls, wks 100 lb.	3.15	3.40	3.15	3.40	2.75	3.00
Powd, c-l, bbls, wks 100 lb.	...	3.55	...	3.55	3.15	3.40
Chrome, bbls 100 lb.	6.50	6.75	6.50	6.75	6.50	7.25
Potash, lump, c-l, bbls, wks 100 lb.	3.65	3.90	3.65	3.90	3.25	3.50
Granular, c-l, bbls, wks 100 lb.	3.40	3.65	3.40	3.65	3.00	3.25
Powd, c-l, bbls, wks 100 lb.	3.80	4.05	3.80	4.05	3.40	3.65
Soda, bbls, wks 100 lb.	...	3.25	...	3.25	...	3.25
Aluminum metal, c-l, NY 100 lb.	...	20.00	...	20.00	19.00	20.00
Acetate, 20%, bbls lb.	.07½	.09	.07½	.10	.09	.10
Basic powd, bbls, delv lb.	.40	.50	.40	.50	...	...
Chloride anhyd, 99%, wks lb.	.07	.12	.07	.12	.07	.12
93%, wks lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06¼	.06	.06¼	.06	.06¼
Solution, drs, wks lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Formate, 30% sol bbls, c-l, delv lb.	...	.13	...	.13	...	...
Hydrate, 96%, light, 90 lb bbls, delv lb.	.12	.13	.12	.13	.13	.15
heavy, bbls, wks lb.	.029	.03½	.029	.03½	.029	.03½
Oleate, drs lb.	.16¾	.18½	.16¾	.18½	.16¾	.18½
Palmitate, bbls lb.	...	.23	...	.23	.22	.23
Resinate, pp., bbls lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls lb.	.19	.21	.19	.21	.19	.21
Sulfate, com, c-l, bgs, wks 100 lb.	...	1.35	...	1.35	...	1.35
c-l, bbls, wks 100 lb.	...	1.55	...	1.55	...	1.55
Sulfate, iron-free, c-l, bgs, wks 100 lb.	...	2.00	...	2.00	...	1.90
c-l, bbls, wks 100 lb.	...	2.20	...	2.20	...	2.05
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd fert com, tks lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	.16	.22	.16	.22	.16	.22
26°, 800 lb drs, delv lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Aqua 26°, tks, NH cont.	...	.05	...	.05	.04½	.05
tk wagon lb.	...	.02	...	.02	...	.02
Ammonium Acetate, kgs lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b. wks 100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls lb.	.16	.17	.16	.17	.16	.17
carbonate, tech, 500 lb bbls lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks 100 lb.	4.45	4.90	4.45	4.90	4.45	4.90
Gray, 250 lb bbls, wks 100 lb.	5.50	6.25	5.50	6.25	5.00	6.25
Lump, 500 lbs cks spot lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls lb.	...	.23	...	.23	...	...
Linoleate, 80% anhyd, bbls lb.	...	.15	...	.15	.11	.15
Naphthenate, bbls lb.	...	.17	...	.17	...	...
Nitrate, tech, cks lb.	.038	.0405	.038	.0405	.03¾	.04
Oleate, drs lb.	...	.15	...	.15	.15	.10
Oxalate, neut, cryst, powd, bbls lb.	.19	.20	.19	.22½	.22½	.23
Perchlorate, kgs lb.	...	.16	...	.16	...	.16
Persulfate, 112 lb kgs lb.	.21	.24	.21	.24	.21	.24
Phosphate, dibasic tech, powd, 325 lb bbls lb.	.07½	.10	.07½	.10	.07½	.10
Ricinoleate, bbls lb.	...	.15	...	.15	...	...
Stearate, anhyd, bbls lb.	...	.24	...	.24	...	...
Paste, bbls lb.	...	.07½	...	.07½	...	...

g Grain alcohol 20c a gal. higher in each case.

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Ammonium (continued).					
Sulfate, dom, f.o.b., bulk ton	...	28.50	...	28.50	26.00	28.00
200 lb bgs ton	...	29.80	...	29.80	...	29.30
100 lb bgs lb.	...	30.50	...	30.50	...	30.00
Sulfocyanide, pure, kgs lb.	...	.55	...	.55	...	.55
Amyl Acetate (from pentane) tks, delv lb.	...	.11½	...	.11½	...	.11½
tech, drs, delv lb.	...	.12	...	.12	.11½	.13½
Secondary, tks, delv lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv lb.	...	.09½	...	.09½	...	.09½
tks, delv lb.	...	.08½	...	.08½	...	.08½
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks lb.	.07	.077	.07	.077	.07	.077
tks, wks lb.	...	.06	...	.06	...	.06
Mercaptan, drs, wks lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs lb.	...	.25	...	.25	...	.25
Stearate, lcl, wks, drs lb.	...	.26	...	.26	...	.26
Amylene, drs, wks lb.	.102	.11	.102	.11	.102	.11
tks, wks lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks lb.	.14½	.17½	.14½	.17½	.15	.17½
Annatto fine lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% lb.	...	.75	...	.75	...	.75
40% lb.	...	.18	...	.18	...	.18
Anthraquinone, sublimed, 125 lb bbls lb.	...	.65	...	.65	.50	.65
Antimony metal slabs, ton lots lb.	.13¾	.14	.13¾	.14	.13½	.17¼
Butter of, see Chloride.						
Chloride, soln cbys lb.	...	.17	...	.17	...	.17
Needle, powd, bbls lb.	.14	.16	.14	.16	.14	.19½
Oxide, 500 lb bbls lb.	.12½	.13	.12½	.16½	.14¼	.16½
Salt, 63% to 65%, tins lb.	.26	.27	.26	.27	.22	.24
Sulfuret, golden, bbls lb.	.22	.23	.22	.23	.22	.23
Archil, conc, 600 lb bbls lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls lb.	.18	.20	.18	.20	.18	.20
Aroclors, wks lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl lb.	.08½	.09	.08½	.09	.08½	.09¼
Arsenic, Metal lb.	.42	.44	.42	.44	.42	.44
Red, 224 lb cs kgs lb.	...	.15¾	...	.15¾	...	.15¾
White, 112 lb kgs lb.	.03	.04	.03	.04	.03	.04
Barium Carbonate precip, 200 lb bgs, wks ton	52.50	62.50	52.50	62.50	52.50	62.50
Nat (witherite) 90% gr, c-l, wks, bgs ton	...	44.00	...	44.00	42.00	45.00
Chlorate, 112 lb kgs, NY lb.	.16½	.17½	.16½	.17½	.16½	.17½
Chloride, 600 lb bbls, delv, zone 1 ton	77.00	92.00	77.00	92.00	74.00	92.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls lb.	.04¾	.05½	.04¾	.05½	.04¾	.05½
Nitrate, bbls lb.	.07	.08¼	.07	.08¼	.07	.08¼
Barytes, floated, 350 lb bbls c-l, wks ton	...	23.65	...	23.65	...	23.65
Bauxite, bulk, mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks ton	...	16.00	...	16.00	...	16.00
200 mesh ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb drs, wks lb.	.60	.62	.60	.62	.60	.62
Benzene (Benzol), 90%, Ind, 8000 gal tks, ft all'd gal.	...	.16	...	.16	...	.16
90% c-l, drs gal.	...	.21	...	.21	...	.21
Ind pure, tks, frt all'd gal.	...	.16	...	.16	...	.16
Benzidine Base, dry, 250 lb bbls lb.	.70	.72	.70	.72	.70	.72
Benzoyl Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, 95-97% rfd, drs lb.	.30	.40	.30	.40	.30	.40
Tech, drs lb.	.25	.26	.25	.26	.25	.26
Beta-Naphthol, 250 lb bbl, wks lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls lb.	.51	.52	.51	.52	.51	.52
Bismuth metal lb.	1.05	1.15	1.00	1.10	1.00	1.10
Chloride, boxes lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes lb.	3.15	3.20	3.15	3.20	3.15	3.20
Oxychloride, boxes lb.	...	2.95	...	2.95	2.75	3.04
Subbenzoate, boxes lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs lb.	1.13	1.16	1.13	1.58	1.23	1.58
Trioxide, powd, boxes lb.	...	3.57	...	3.57	3.45	3.57
Subnitrate, fibre, drs lb.	1.03	1.06	1.03	1.48	1.22	1.48
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls, wks ton *h*	40.00	75.00	40.00	75.00	40.00	75.00
Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	...	2.00	...	2.00	...	2.00
lcl, drs, wks lb.	2.25	3.60	2.25	3.60	2.25	3.60
Blood, dried, f.o.b., NY unit	...	2.70	2.70	3.10	3.10	4.30
Chicago, high grade unit	...	2.80	2.80	3.35	3.00	4.65
Imported shipt unit	...	3.00	3.00	3.45	3.25	4.10
Blues, Bronze Chinese Milori Prussian Soluble lb.	.36	.37	.36	.37	.36	.37
Ultramarine,* dry, wks, bbls lb.	...	.11	...	.11	.10	.11
Regular grade, group 1 lb.	...	.16	...	.16	.15	.16
Special, group 1 lb.	...	.19	...	.19	.18	.19
Pulp, No. 1 lb.	...	.27	...	.27	.26	.27
Bone, 4½ + 50% raw, Chicago ton	26.00	29.00	26.00	30.00	26.00	30.00
Bone Ash, 100 lb kgs lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls lb.	.06½	.08¼	.06½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp ton	...	21.00	21.00	23.75	23.75	27.50
Domestic, bgs, Chicago ton	17.00	19.00	17.00	22.00	19.00	27.00
Borax, tech, gran, 80 ton lots, sacks, delv ton *i*	...	42.00	...	42.00	40.00	42.00
bbls, delv ton *i*	...	52.00	...	52.00	50.00	52.00

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

Boost your salesmen in... not out! Give them this *plus* feature to talk about: "Shipment in Bemis Waterproof Bags!" These modern containers assure *factory fresh* arrival... reduce damage from moisture, dust, odors and drying out... save on packing and shipping costs. Send for details.

BEMIS BRO. BAG CO.
407 Poplar Street, St. Louis
5104 2nd Avenue, Brooklyn

Bemis 3-Ply Protection
Burlap or cotton cemented to siftproof paper with a flexible waterproof adhesive.

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Prices

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Borax (continued):						
Tech, powd, 80 ton lots, sacks	ton *i*	...	47.00	... 47.00	45.00	47.00
bbls, delv	ton *i*	...	57.00	... 57.00	56.00	57.00
Bordeaux Mixture, drs	lb.	.11	.11½	.11 .11½	.10½	.11
Bromine, cases	lb.	.30	.43	.30 .43	.30	.43
Bronze, Al, pwd, 300 lb drs	lb.	.90½	.92½	.90½ .92½	.80	1.50
Gold, blk	lb.	.45	.65	.45 .65	.40	.65
Butanes, com 16-32* group 3 tks	lb.	.02¼	.03¾	.02¼ .03¾	.02¼	.03¾
Butyl, Acetate, norm drs, frt allowed	lb.	.10	.10½	.10 .10½	.10	.10½
tks, frt allowed	lb.	...	.09	... .09	...	.09
Secondary, tks, frt allowed	lb.	...	.07	... .07	.07	.07½
drs, frt, allowed	lb.	.08	.08½	.08 .08½	.08	.09
Aldehyde, 50 gal drs, wks	lb.	.16½	.17½	.16½ .17½	.16½	.17½
Carbinol, norm drs, wks	lb.	.60	.75	.60 .75	.60	.75
Crotonate, norm, 55 and 110 gal drs, delv	lb.	...	.36	... .36	...	...
Lactate	lb.	.22½	.23½	.22½ .23½	.22½	.23½
Oleate, drs, frt allowed	lb.	...	.25	... .25	...	.25
Propionate, drs	lb.	.18	.18½	.18 .18½	.18	.18½
tks, delv	lb.	...	.17	... .17	...	.17
Stearate, 50 gal drs	lb.	...	.26	... .26	.25	.26
Tartrate, drs	lb.	.55	.60	.55 .60	.55	.60
Butyraldehyde, drs, lcl, wks	lb.	...	.35½	... .35½	...	.35½
Cadmium Metal	lb.	...	1.20	1.20 1.60	1.05	1.60
Sulfide, orange, boxes	lb.	1.50	1.60	1.50 1.60	.90	1.60
Calcium, Acetate, 150 lb bgs c-l, delv	100 lb.	...	1.65	... 1.65	1.65	2.25
Arsenate, c-l, E. of Rockies, dealers, drs	lb.	.06¾	.07¼	.06¾ .07¼	.06¼	.07¾
Carbide, drs	lb.	.05	.06	.05 .06	.05	.06
Carbonate, tech, 100 lb bgs c-l	lb.	...	1.00	... 1.00	...	1.00
Chloride, flake, 375 lb drs, burlap bgs, c-l, delv	ton	...	22.00	22.00 23.50	22.00	23.50
paper bgs, c-l, delv	ton	23.00	36.00	23.00 36.00	...	...
Solid, 650 lb drs, c-l, delv	ton	...	20.00	20.00 21.50	20.00	21.50
Ferrocyanide, 350 lb bbls wks	lb.	...	.17	... .17	...	.17
Gluconate, Pharm, 125 lb bbls	lb.	.50	.57	.50 .57	.50	.57
Levulinate, less than 25 bbl lots, wks	lb.	...	3.00	... 3.00	...	...
Nitrate, 100 lb bgs	ton	...	28.00	... 28.00	26.10	28.00
Palmitate, bbls	lb.	.22	.23	.22 .23	.22	.23
Phosphate, tribasic, tech, 450 lb bbls	lb.	.06½	.07½	.06½ .07½	.06½	.07½
Resinate, precip, bbls	lb.	.13	.14	.13 .14	.13	.14
Stearate, 100 lb bbls	lb.	.19	.21	.19 .21	.19	.21
Camphor, slabs	lb.	.54	.56	.54 .56	.54	.56
Powder	lb.	.54	.56	.54 .56	.54	.56
Camwood, Bk, ground bbls	lb.	.16	.18	.16 .18	.16	.18
Carbon Bisulfide, 500 lb drs	lb.	.05	.05¾	.05 .05¾	.05	.05¾
Black, c-l, bgs, delv, price varying with zone†	lb.	.027	.0380	.027 .0380	.0320	.0535
lcl, bgs, f.o.b. whse	lb.	...	.05¾	... .05¾	.06½	.07
cartons, f.o.b. whse	lb.	...	.06¼	... .06¼	.07	.07¾
cases, f.o.b. whse	lb.	...	.07	... .07	.07¾	.08¼
Decolorizing, drs, c-l	lb.	.08	.15	.08 .15	.08	.15
Dioxide, Liq 20-25 lb cyl	lb.	.06	.08	.06 .08	.06	.08
Tetrachloride, 55 or 110 gal drs, c-l, delv	lb.	.05¼	.06	.05¼ .06	.05¼	.06
Casein, Standard, Dom, grd	lb.	.06½	.07	.06½ .13½	.11	.20¾
80-100 mesh, c-l, bgs	lb.	.07	.07½	.07 .14	.11½	.21¼
Castor Pomace, 5½ NH_3, c-l, bgs, wks	ton	...	20.00	20.00 21.00	21.00	25.00
Imported, ship, bgs	ton	...	21.00	... 21.00	nom.	17.00
Celluloid, Scraps, ivory cs	lb.	.12	.15	.12 .15	.12	.15
Transparent, cs	lb.	...	.20	... .20	...	.20
Cellulose, Acetate, 50 lb kgs	lb.	...	.40	... .40	.40	.55
Chalk, dropped, 175 lb bbls	lb.	.03	.03¾	.03 .03¾	.03	.03¾
Precip, heavy, 560 lb cks	lb.	.03	.04	.03 .04	.03	.04
Light, 250 lb cks	lb.	.03¼	.04	.03¼ .04	.03	.04
Charcoal, Hardwood, lump, blk, wks	bu.	...	.15	... .15	...	.15
Softwood, bgs, delv*	ton	23.00	34.00	23.00 34.00	23.00	34.40
Willow, powd, 100 lb bbl. wks	lb.	.06	.07	.06 .07	.06	.07
Chestnut, clarified, tks, wks	lb.	...	.02125	... .02125	.01625	.02125
25%, bbls, wks	lb.	...	.0225	... .0225	.02	.0225
Pwd, 60%, 100 lb bgs, wks	lb.	...	.04⅞	... .04⅞	...	.04⅞
China Clay, c-l, blk mines	ton	...	7.00	... 7.00	6.50	7.00
Imported, lump, blk	ton	22.00	25.00	22.00 25.00	22.00	25.00
Chlorine, cyls, lcl, wks, contract	lb.	.07½	.08½	.07½ .08½	.07½	.08½
cyls, c-l, contract	lb. *j*	...	.05½	... .05½	...	.05½
Liq, tk, wks, contract 100	lb.	...	2.15	... 2.15	...	2.15
Multi, c-l, cyls, wks, cont	lb.	2.30	2.55	2.30 2.55	2.30	2.55
Chloroacetophenone, tins, wks	lb.	3.00	3.50	3.00 3.50	3.00	3.50
Chlorobenzene, Mono, 100 lb drs, lcl, wks	lb.	.06	.07½	.06 .07½	.06	.07½
Chloroform, tech, 1000 lb drs	lb.	.20	.21	.20 .21	.20	.21
USP, 25 lb tins	lb.	.30	.31	.30 .31	.30	.31
Chloropicrin; comml cyls	lb.	...	.80	... .80	...	.80
Chrome, Green, CP	lb.	.21	.25	.21 .25	.20	.25
Yellow	lb.	.14½	.15½	.14½ .15½	.13	.16½

j A delivered price; * Depends upon point of delivery; † New bulk price, tank cars ¼c per lb. less than bags in each zone.

Current

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Chromium, Acetate, 8% Chrome, bbls	lb.	.05	.08	.05	.08	.05	.08
Fluoride, powd, 400 lb bbl	lb.	.27	.28	.27	.28	.27	.28
Coal tar, bbls	bbl.	7.50	8.00	7.50	8.00	6.75	9.00
Cobalt Acetate, bbls	lb.	.66	.68	.66	.68	.58	.68
Carbonate tech, bbls	lb.	...	1.63	...	1.63	1.42¾	1.63
Hydrate, bbls	lb.	...	1.36	...	1.36	...	...
Linoleate, solid, bbls	lb.	...	.33	...	.33	.31	.33
paste, 6%, drs	lb.	...	.31	...	.31	...	.31
Oxide, black, bgs	lb.	...	1.67	...	1.67	1.41	1.67
Resinate, fused, bbls	lb.	...	.13½	...	.13½	.13	.13½
Precipitated, bbls	lb.	...	.34	...	.34	.30½	.34
Cochineal, gray or bk **bgs**	lb.	.35	.38	.35	.38	.32	.38
Teneriffe silver, bgs	lb.	.36	.39	.36	.39	.33	.39
Copper, metal, electrol 100 lb.		...	10.00	10.00	11.00	11.00	16.25
Acetate, normal, bbls, wks	lb.	.21	.23	.21	.23	...	...
Carbonate, 400 lb bbls	lb.	...	.10¼	.10¼	.10½	.10½	.12½
52-54% bbls	lb.	.14½	.15½	.14½	.16¾	.15¾	.19
Chloride, 250 lb bbls	lb.	.13	.14	.13	.17	.15	.18
Cyanide, 100 lb drs	lb.	...	.34	.34	.38	.37	.38
Oleate, precip, bbls	lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks	lb.	.14½	.15	.14½	.17½	.17	.18
red 100 lb bbls	lb.	...	.16	.16	.19775	.17	.19975
Resinate, precip, bbls	lb.	.15	.16	.15	.16	.15	.19
Stearate, precip, bbls	lb.	.23	.24	.23	.24	.23	.40
Sub-acetate verdigris, 400 lb bbls	lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.		...	4.25	...	4.25	4.25	4.50
Copperas, crys and sugar bulk c-l, wks	ton	12.00	13.00	12.00	13.00	12.00	13.00
Corn Sugar, tanners, bbls 100 lb.		3.15	3.25	3.10	3.30	3.15	4.34
Corn Syrup, 42°, bbls	100 lb.	...	3.09	3.04	3.16	3.11	4.36
43°, bbls	100 lb.	...	3.14	3.09	3.21	3.16	4.41
Cotton, Soluble, wet, 100 lb bbls	lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls	lb.	.20¾	.21¾	.19¾	.21¾	.15	.20¼
Creosote, USP, 42 lb cbys	lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks	gal.	.13½	.14	.13½	.14	.13	.14
Grade 2	gal.	.122	.132	.122	.132	.113	.132
Cresol, USP, drs	lb.	.12	.12½	.12	.12½	.10	.13
Crotonaldehyde, 97%, 55 and 110 gal drs, delv	lb.	...	.22	.22	.30	.26	.30
Cutch, Philippine, 100 lb bale	lb.	.05¼	.06	.04	.06	.04	.04¾
Cyanamid, bgs, c-l, frt allowed Ammonia	unit	...	1.15	...	1.15	1.10	1.15
Derris root 5% rotenone, bbls	lb.	.39	.43	.39	.43	.39	.47
Dextrin, corn, 140 lb bgs f.o.b., Chicago	100 lb.	3.50	3.70	3.45	3.75	3.50	5.00
British Gum, bgs	100 lb.	3.75	3.95	3.70	4.00	3.75	5.25
Potato, Yellow, 220 lb bgs	lb.	.07¼	.08¾	.07¼	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl	lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl	lb.	...	.0715	.0715	.08	...	.08
White, 140 lb bgs	100 lb.	3.45	3.65	3.45	3.70	4.00	4.58
Diamylamine, c-l, drs, wks	lb.	.47	.75	.47	.75	.47	.75
Diamylene, drs, wks	lb.	.095	.102	.095	.102	.095	.102
tks, wks	lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs	lb.	.085	.092	.085	.092	.085	.092
tks, wks	lb.	...	.075	...	.075	...	.075
Oxalate, lcl, drs, wks	lb.	...	.30	...	.30	...	.30
Diamylphthalate, drs, wks	lb.	.20½	.21	.20½	.21	.19	.21½
Diamyl Sulfide, drs, wks	lb.	...	1.10	...	1.10	...	1.10
Diatomaceous Earth, see Kieselguhr.							
Dibutoxy Ethyl Phthalate, drs, wks	lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks	lb.	...	.55	...	.55	...	...
Dibutyl Ether, drs, wks, lcl	lb.	...	.30	...	.30	...	.30
Dibutylphthalate, drs, wks, frt all'd	lb.	...	.21	...	.21	.19½	.21
Dibutyltartrate, 50 gal drs	lb.	.45	.54	.45	.54	.35	.50
Dichlorethylene, drs	lb.	...	.25	...	.25	.25	.29
Dichloroethylether, 50 gal drs, wks	lb.	.15	.16	.15	.16	.15	.16
tks, wks	lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks	lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks	lb.	no prices		...	...	...	...
tks, wks	lb.	no prices		...	...	...	...
Diethanolamine, tks, wks	lb.	...	.23	...	.23	.23	.25
Diethylamine, 400 lb drs	lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylaniline, 850 lb drs	lb.	.40	.52	.40	.50	.40	.50
Diethyl Carbinol, drs	lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs	lb.	.31¾	.35	.31¾	.35	.31¾	.35
Diethylorthotoluidin, drs	lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs	lb.	.19	.19½	.19	.19½	.18	.19½
Diethylsulfate, tech, drs, wks, lcl	lb.	.13	.14	.13	.14	.13	.20
Diethyleneglycol, drs	lb.	.16	.17	.16	.17	.16	.23
Mono ethyl ethers, drs	lb.	.15	.16	.15	.16	.15	.17
tks, wks	lb.	...	.14	...	.14	.14	.15
Mono butyl ether, drs	lb.	.23	.24	.23	.24	.23	.26
tks, wks	lb.	...	.22	...	.22	...	...
Diethylene oxide, 50 gal drs, wks	lb.	.20	.24	.20	.24	.20	.24
Diglycol Oleate, bbls	lb.	...	.21	...	.21	.21	.24
Laurate, bbls	lb.	...	.27½	...	.27½	...	...
Stearate, bbls	lb.	...	.27½	...	.27½	...	...
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis	lb.	...	1.00	...	1.00	...	.95
Dimethylaniline, 340 lb drs	lb.	.26	.27	.26	.27	.26	.27
Dimethyl Ethyl Carbinol, drs	lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt allowed	lb.	...	.19	...	.19	.20½	.21
Dimethylsulfate, 100 lb drs	lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls	lb. *k*	.16	.19	.16	.19	.16	.19

k Higher price is for purified material.

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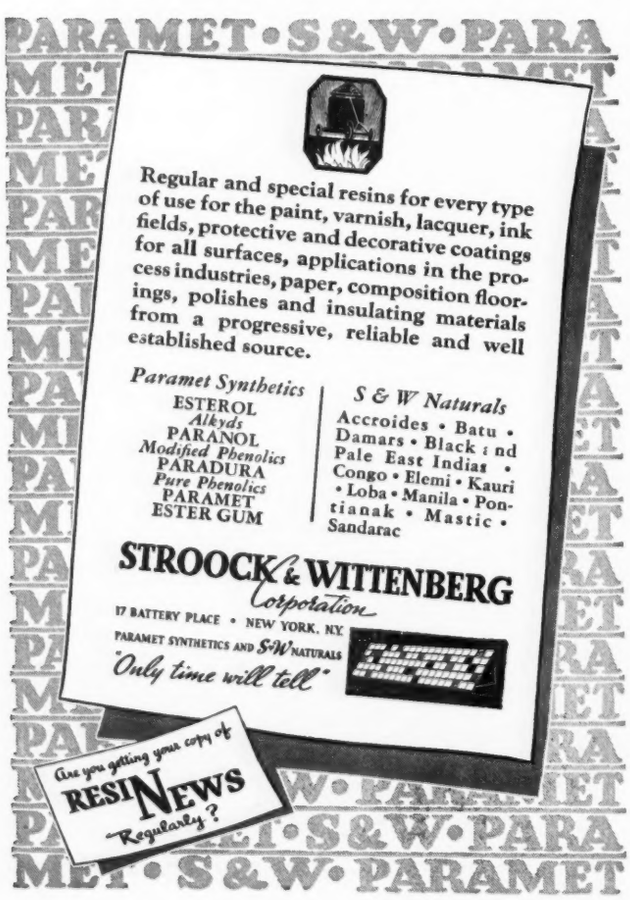
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Dinitrochlorobenzene
Glue, Casein

Prices

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Dinitrochlorobenzene, 400 lb bbls lb.	.13½	.14	.13½	.14	.14	.17½
Dinitronaphthalene, 350 lb bbls lb.	.35	.38	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	...	.15½	...	.15½	.14½	.15½
Diphenyl, bbls lb.	.15	.25	.15	.25	.15	.25
Diphenylamine lb.	.31	.32	.31	.32	.31	.32
Diphenylguanidine, 100 lb drs lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	...	nom.	...	nom.	34.00	nom.
Extract lb.	.05	.05½	.05	.05½	.05	.05½
EGG YOLK						
Egg Yolk, dom., 200 lb cases lb.	.60	.63	.60	.68	.68	nom.
Imported lb.	.65	.68	.65	.68	.53	.65
Epsom Salt, tech, 300 lb bbls c-l, NY 100 lb.	1.90	2.10	1.90	2.10	1.80	2.10
USP, c-l, bbls 100 lb.	...	2.10	...	2.10	2.00	2.10
Ether, USP anaesthesia 55 lb drs lb.	.22	.23	.22	.23	.22	.23
(Conc) lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal drs lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed lb.	...	.06	...	.06	...	.06
Nitrous, conc, bottles lb.	...	.68	...	.68	.68	.77
Synthetic, wks, drs lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks, frt all'd lb.	...	.05½	...	.05½	.05½	.06½
drs, frt all'd lb.	...	.06½	...	.06½	.06½	.07½
95%, tks, frt allowed lb.	...	.06¾	...	.06¾	...	.06¾
drs, frt all'd lb.	...	.07¾	...	.07¾	...	.07¾
Acetoacetate, 110 gal drs lb.	...	.27½	...	.27½	...	.27½
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech, drs lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt all'd lb.	.6440	.9440	.6440	1.00	...	...
Chloride, 200 lb drs lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate, cbys lb.	...	.30	...	.30	...	.30
Crotonate, drs lb.	1.00	1.25	1.00	1.25	1.00	1.25
Formate, drs, frt all'd lb.	.27	.28	.27	.28	.27	.31
Lactate, drs, wks lb.	...	.33	...	.33	...	.33
Oxalate, drs, wks lb.	.30	.34	.30	.34	.30	.34
Oxybutyrate, 50 gal drs, wks lb.	.30	.30½	.30	.30½	.30	.30½
Silicate, drs, wks lb.	...	.77	...	.77	...	.77
Ethylene Dibromide, 60 lb drs lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont lb.	.75	.85	.75	.85	.75	.85
Anhydrous lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, wks lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks lb.	.17	.21	.17	.21	.17	.21
tks, wks lb.	...	.16	...	.16	...	.16
Mono Butyl Ether, drs, wks lb.	.20	.21	.20	.21	.20	.21
tks, wks lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs, wks lb.	.16	.17	.16	.17	.16	.17
tks, wks lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks lb.	...	.14	...	.14	...	.14
tks, wks lb.	...	.13	...	.13	...	.13
Mono, Methyl Ether, drs wks lb.	.18	.22	.18	.22	.18	.22
tks, wks lb.	...	.17	...	.17	...	.17
Oxide, cyl lb.	.50	.55	.50	.55	.50	.55
Ethylidenaniline lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery ton	17.00	19.00	17.00	19.00		14.50
Powd, blk, wks ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground, wks unit *l*	...	3.00	...	3.00	...	...
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis unit *m*	...	nom.	...	...	2.75	3.15
Fluorspar, 98%, bgs lb.	...	33.00	...	33.00		no prices
Formaldehyde, USP, 400 lb bbls, wks lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.06¼
Fossil Flour lb.	.02½	.04	.02½	.04	.02¼	.04
Fullers Earth, blk, mines ton	10.00	11.00	10.00	11.00	6.50	15.00
Imo powd, c-l, bgs ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.12½	.14	.12½	.14	.12½	.18
Fustic, crystals, 100 lb boxes lb.	.22	.26	.22	.26	.20	.26
Liquid 50°, 600 lb bbls lb.	.09½	.13	.09½	.13	.08½	.13
Solid, 50 lb boxes lb.	.17½	.19½	.17½	.19½	.16	.19½
G SALT PASTE						
G Salt paste, 360 lb bbls lb.	.45	.47	.45	.47	.45	.47
Gall Extract lb.	.19	.20	.19	.20	.19	.20
Gambier, com 200 lb bgs lb.	.06¾	.07¾	.06¾	.07¾	...	nom.
Singapore cubes, 150 lb bgs 100 lb.	.10½	.11	.10½	.11	.09½	.10½
Gelatin, tech, 100 lb cs lb.	.45	.50	.45	.50	.45	.55
Glauber's Salt, tech, c-l, bgs, wks* 100 lb.	.95	1.15	.95	1.15	.95	1.15
Anhydrous, see Sodium Sulfate.						
Glue, bone, com grades, c-l bgs lb.	.13	.16½	.13	.16½	.11	.17½
Better grades, c-l, bgs lb.	.14½	.16½	.14½	.16½	.12½	.17½
Casein, kgs lb.	.18	.22	.18	.22	.18	.22

l + 10; *m* + 50; *Bbls. are 20c higher.

Current

Glycerin
Gum, Hemlock

		Current Market		1938 Low	1938 High	1937 Low	1937 High
Glycerin, CP, 550 lb drs	lb.	.15½	.16	.15½	.16	.15½	.29
Dynamite, 100 lb drs	lb.	.15½	.16	.15½	.16	.15½	.29
Saponification, drs	lb.	.10½	.11	.09½	.11¼	.11	.29
Soap Lye, drs	lb.	.09½	.10	.08½	.10¼	.10	.27
Glyceryl Bori-Borate, bbls	lb.	...	.40	...	.40	...	...
Monoricinoleate, bbls	lb.	...	.27	...	.27	...	...
Monostearate, bbls	lb.	...	.30	...	.30	...	...
Oleate, bbls	lb.	...	.22	...	.22	...	...
Phthalate	lb.	...	.37	...	.37	.29	.37
Glyceryl Stearate, bbls	lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls	lb.	...	.26	...	.26	...	...
Phthalate, drs	lb.	...	.40	...	.40	.29	.40
Stearate, drs	lb.	...	.27½	...	.27½	.23	.27½
GUMS							
Gum Aloes, Barbadoes	lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts	lb.	.10¼	.10¾	.10¼	.12	.10½	.15½
White sorts, No. 1, bgs	lb.	.27	.28	.24	.28	.24	.30
No. 2, bgs	lb.	.25	.26	.22	.26	.22	.28
Powd, bbls	lb.	.13½	.14	.13½	.16	.14	.19
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY	lb.	02½	.10½	.02½	.10½	.02½	.10½
California, f.o.b., NY, drs	ton	29.00	55.00	29.00	55.00	29.00	55.00
Egyptian, 200 lb cases, f.o.b., NY	lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases	lb.	.18	.20	.15	.20	.15	.25
Copal, Congo, 112 lb bgs, clean, opaque	lb.	...	.18¾	.18¾	.19¼	.18⅞	.19¼
Dark amber	lb.	...	.08¼	.08¼	.08⅞	.06⅞	.09¼
Light amber	lb.	...	.12⅜	.12⅜	.13¼	.10¼	.14⅜
Copal, East India, 180 lb bgs							
Macassar pale bold	lb.	...	.12⅛	.12⅛	.13	...	.13
Chips	lb.	...	.05⅜	...	.05¾	.05⅜	.06½
Dust	lb.	.03¼	.04	.03½	.04⅛	.03⅝	.04⅜
Nubs	lb.	...	.10¾	...	.10⅜	.10⅜	.11¼
Singapore, Bold	lb.	...	.15¼	...	.15¼	.15¼	.15⅝
Chips	lb.	...	.04¾	...	.04¾	.04¼	.05
Dust	lb.	.03¼	.04	.03¼	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.10	...	.10	.10	.10¾
Copal Manilla, 180-190 lb baskets, Loba A	lb.	...	.12	...	.12	.09¾	.12
Loba B	lb.	...	.11	.11	.11⅝	.09¼	.11⅝
Loba C	lb.	...	.10⅛	.10⅛	.11¼	.08⅞	.11¼
DBB	lb.	...	.08	.08	.08¾	.08	.08¾
Dust	lb.	...	.06¾	.06¾	.06⅝	.05¾	.06⅝
MA sorts	lb.	...	.06⅛	.06⅛	.07¼	.06¾	.07¼
Copal Pontianak, 224 lb cases, bold genuine	lb.	...	.16½	...	.16½	.15½	.16½
Chips	lb.	...	.10¼	...	.10¼	.09⅛	.11⅛
Mixed	lb.	...	.14	...	.14	.13½	.14
Nubs	lb.	...	.12⅞	...	.12⅞	.12¾	.13½
Split	lb.	...	.13⅞	...	.13⅞	.13½	.15¼
Dammar Batavia, 136 lb cases							
A	lb.	...	.22⅜	.22⅜	.25½	.23½	.25½
B	lb.	...	.21	.21	.24	.22⅛	.24
C	lb.	...	.18⅛	.18⅛	.20⅜	.18½	.20⅜
D	lb.	...	.15⅝	.15⅝	.17½	.15¼	.17½
A/D	lb.	...	.17¾	.17¾	.20⅜	.17⅝	.20⅜
A/E	lb.	...	.15	.15	.17¼	.14⅞	.17¼
E	lb.	...	.08⅛	.08⅛	.08½	.07½	.08½
F	lb.	...	.07¼	...	.07¼	.06¼	.07¼
Singapore, No. 1	lb.	...	.19¼	.19¼	.21⅛	.17⅛	.21½
No. 2	lb.	...	.13	.13	.15⅜	.14⅛	.16¼
No. 3	lb.	...	.05½	.05½	.05¾	...	.05¾
Chips	lb.	...	.12⅛	.12⅛	.13½	.10¼	.13½
Dust	lb.	...	.05½	.05½	.05¾	.05¾	.06
Seeds	lb.	...	.08⅝	.08⅝	.09½	.07⅛	.09½
Elemi, cons	lb.	...	.08¾	.08¾	.09½	.09⅜	.10¼
Ester	lb.	.07¼	.08	.07¼	.08½	.09	.12
Gamboge, pipe, cases	lb.	.70	.75	.70	.80	.58	.80
Powd, bbls	lb.	.75	.80	.75	.85	.65	.85
Ghatti, sol. bgs	lb.	.11	.15	.11	.15	.11	.15
Karaya, powd, bbls, xxx	lb.	.27	.30	.27	.30	.24	.30
xx	lb.	.18	.19	.18	.19	.16	.19
No. 1	lb.	.12	.13	.12	.13	.09½	.13
No. 2	lb.	.11	.12	.11	.12	.08½	.12
Kauri, NY, San Francisco, Brown XXX, cases	lb.	.60	.60½	.60	.60½	.60	.60½
BX	lb.	...	.38	...	.38	.33	.38
B1	lb.	...	.28	...	.28	.21	.28
B2	lb.	...	.24	...	.24	.15½	.26
B3	lb.	...	.18½	...	.18½	.12	.18½
Pale XXX	lb.	...	.61	...	.61	.61	.65½
No. 1	lb.	...	.41	...	.41	.40	.41
No. 2	lb.	...	.24	...	.24	.22	.24
No. 3	lb.	...	.17¾	...	.17¾	.15	.17¾
Kino, tins	lb.	2.50	2.75	2.00	2.75	.70	2.10
Mastic	lb.	.55	.56	.55	.56	.55	.58
Sandarac, prime quality, 200 lb bgs & 300 lb cks	lb.	.24	.25	.24	.26	.25	.35
Senegal, picked bags	lb.	.25	.27	.23	.27	.20	.29
Sorts	lb.	.10½	.11	.10½	.12	.09¾	.15
Thus, bbls	280 lbs.	...	14.00	13.50	14.00	12.00	14.00
Strained	280 lbs.	...	14.00	...	14.00	12.00	14.00
Tragacanth, No. 1, cases	lb.	2.75	3.00	2.75	3.00	2.40	3.25
No. 2	lb.	2.40	2.75	2.40	2.75	2.00	2.75
No. 3	lb.	2.35	2.70	2.35	2.70	1.95	2.70
No. 4	lb.	2.30	2.65	2.30	2.65	1.85	2.65
No. 5	lb.	2.25	2.50	2.25	2.50	1.65	2.50
Yacca, bgs	lb.	.03½	.04½	.03½	.04½	.03¼	.04½
Helium, cyl (200 cu. ft.)	cyl.	...	25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls	lb.	.18	.34	.18	.34	.16	.34
Hemlock, 25%, 600 lb bbls, wks	lb.	.03	.03¼	.03	.03¼	.03	.03¼
tks	lb.	...	.02¾	...	.02¾	...	.02¾

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Caustic Soda
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Sodium Chlorate
Bleaching Powder
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Persulphate of Potash
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Hexalene
Manganese Sulfate

Prices

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Hexalene, 50 gal drs, wks	lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks	gal.	...	.10½	...	.10½	...	.10½
Hexamethylenetetramine, powd, drs	lb.	.35	.36	.35	.36	.35	.36
Hexyl Acetate, secondary, delv, drs	lb.	.13	.13½	.13	.13½	.13	.13½
tks	lb.	...	.12	...	.12	...	.12
Hoof Meal, f.o.b. Chicago unit		...	3.00	3.00	3.35	3.20	3.75
Hydrogen Peroxide, 100 vol, 140 lb cbys	lb.	.19½	.20	.19½	.20	.20	.21
Hydroxylamine Hydrochloride	lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls	lb.	.16	.21	.16	.21	.15	.21
INDIGO							
Indigo, Bengal, bbls	lb.	....	2.40	...	2.40	...	2.40
Synthetic, liquid	lb.	.16½	.19	.16½	.19	.16½	.19
Iodine, Resublimed, kgs	lb.	1.50	1.60	1.50	1.60	1.50	1.60
Irish Moss, ord, bales	lb.	.10	.11	.10	.11	.11	.12
Bleached, prime, bales	lb.	.19	.20	.19	.20	.19	.21
Iron Acetate Liq. 17°, bbls, delv	lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.							
Nitrate, coml, bbls 100	lb.	2.32	3.11	2.32	3.11	2.32	3.25
Isobutyl Carbinol (128-132° C) drs, wks	lb.	.33	.34	.33	.34	.33	.34
tks, wks	lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt all'd	lb.	...	.05½	...	.05½	.05½	.06½
drs, frt all'd	lb.	.06½	.07	.06½	.07	.06½	.08
Ether, see Ether, isopropyl.							
Keiselguhr, dom bags, c-l, Pacific Coast	ton	22.00	85.00	22.00	85.00	22.00	85.00
LEAD ACETATE							
Lead Acetate, f.o.b. NY, bbls, White, broken	lb.	...	.11	...	.11	.11	.13½
cryst, bbls	lb.	...	.11	...	.11	.11	.13½
gran, bbls	lb.	...	.11¾	...	.11¾	.11¾	.14¼
powd, bbls	lb.	...	.11¾	...	.11¾	.11¾	.14¼
Arsenate, East, drs	lb.	.12½	.13	.12½	.13½	.11	.13½
Linoleate, solid, bbls	lb.	...	.19	...	.19	.18	.19
Metal, c-l, NY	100 lb.	...	4.50	4.50	4.90	4.75	7.05
Nitrate, 500 lb bbls, wks	lb.	.10	.11½	.10	.11½	.09	.11½
Oleate, bbls	lb.	.18½	.20	.18½	.20	.15	.20
Red, dry, 95% Pb_3O_4, delv	lb.	...	.07	.07	.074	.07¼	.0945
97% Pb_3O_4, delv	lb.	...	.07¼	.07¼	.0765	.07½	.09¾
98% Pb_3O_4, delv	lb.	...	.07½	.07½	.0790	.07¾	.10
Resinate, precip, bbls	lb.	...	.16½	...	.16½	.14	.16½
Stearate, bbls	lb.	.22	.23	.22	.23	.22	.23
Titanate, bbls, c-l, f.o.b. wks, frt all'd	lb.	.11	.11½	.11	.11½	.10	.12
White, 500 lb bbls, wks	lb.	...	.06¼	.06¼	.06¾	.06¾	.09
Basic sulfate, 500 lb bbls, wks	lb.	...	.05¾	.05¾	.06¼	.06¼	.08¾
Lime, chemical quicklime, f.o.b., wks, bulk	ton	7.00	8.00	7.00	8.00	6.00	8.00
Hydrated, f.o.b., wks	ton	8.50	12.00	8.50	12.00	8.00	12.00
Lime Salts, see Calcium Salts.							
Lime sulfur, dealers, tks	gal.	.08	.11½	.08	.11½	...	.11
drs	gal.	.11	.16	.11	.16	.13	.16
Linseed Meal, bgs	ton	...	40.50	39.00	45.00	35.00	42.50
Litharge, coml, delv, bbls	lb.	...	.06	.06	.064	.06¼	.08½
Lithopone, dom, ordinary, delv, bgs	lb.	.04⅜	.04⅝	.04⅜	.04⅝	.04¼	.04⅝
bbls	lb.	.04⅜	.04⅞	.04⅜	.04⅞	.04½	.04⅞
High strength, bgs	lb.	.05⅞	.06⅛	.05⅞	.06⅛	.05¾	.06⅛
bbls	lb.	.06⅛	.06⅜	.06⅛	.06⅜	.06	.06⅜
Titanated, bgs	lb.	.05⅞	.06⅛	.05⅞	.06⅛	.05¾	.06⅛
bbls	lb.	.06⅛	.06⅜	.06⅛	.06⅜	.06	.06⅜
Logwood, 51°, 600 lb bbls	lb.	.09½	.11½	.09½	.11½	.08½	.11½
Solid, 50 lb boxes	lb.	.15	.19	.15	.19	.15	.17½
Sticks	ton	24.00	25.00	24.00	25.00	24.00	25.00
MADDER							
Madder, Dutch	lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl	ton	60.00	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks	lb.	.05¾	.06½	.05¾	.07	.06	.07
Chloride flake, 375 lb drs, c-l, wks	ton	39.00	42.00	39.00	42.00	39.00	42.00
Fluosilicate, crys, 400 lb bbls, wks	lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, calc tech. heavy bbls, frt all'd	lb.	.25	.30	.25½	.30½	...	...
Light, bbls, above basis	lb.	.20	.25	.20	.25½	...	...
USP Heavy, bbls, above basis	lb.	.25	.30	.25	.30½	...	...
Palmitate, bbls	lb.	.33	nom.	...	.33	.33	nom.
Silicofluoride, bbls	lb.	.09½	.10½	.09½	.10½	.09½	.10½
Stearate, bbls	lb.	.21	.24	.21	.24	.21	.24
Manganese acetate, drs	lb.	...	.26½	...	.26½	.25½	.26½
Borate, 30%, 200 lb bbls	lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks	lb.	.09	.12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bgs, c-l	ton	...	62.50	...	62.50	47.50	62.50
Hydrate, bbls	lb.	...	.32	...	.32	...	.32
Linoleate, liq, drs	lb.	.18	.19¼	.18	.19¼	.18	.19¼
solid, precip, bbls	lb.	...	.19	...	.19	.17½	.19
Resinate, fused, bbls	lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, drs	lb.	...	.12	...	.12	...	.12
Sulfate, tech, anhyd, 90-95%, 550 lb drs	lb.	.07	.07½	.07	.07½	.07	.07½

Current

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Mangrove, 55%, 400 lb bbls	lb.	.04	...	.04	...	.04
Bark, African	ton	25.00 25.50	25.00	25.50	25.00	27.00
Mannitol, pure cryst, cs, wks	lb.	1.40	1.40	1.45	1.45	1.48
Marble Flour, blk	ton	12.00 13.00	12.00	13.00	12.00	13.00
Mercury chloride (Calomel)	lb.	1.18	1.18	1.59	1.05	1.60
Mercury metal ... 76 lb. flasks		71.00 73.00	71.00	79.00	81.00	99.00
Meta-nitro-aniline	lb.	.67 .69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls	lb.	1.45 1.55	1.45	1.55	1.45	1.55
Meta-phenylene diamine 300 lb bbls	lb.	.80 .84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb bbls	lb.	.65 .67	.65	.67	.65	.67
Methanol, denat, grd, drs, c-l, frt all'd	gal.	... .34	.34	.36	.36	.53
tks, frt all'd	gal.	... .28	.28	.30	.30	.48
Pure, drs, c-l, frt all'd	gal.	... .38	...	.38	...	.38
tks	gal.	... .33	...	.33	...	.33
95%, tks	gal.	... .31	...	.31	...	.31
97%, tks	gal.	... .32	...	.32	..	.32
Methyl Acetate, tech, tks, delv	lb.	... .06½	...	.06½	...	...
55 gal drs, delv	lb.	.07½ .08	.07½	.08	...	...
C.P. 97-99%, tks, delv	lb.	... .07	...	.07	...	...
55 gal drs, delv	lb.	.08 .08½	.08	.08½	...	...
Acetone, frt all'd, drs	gal. *p*	.31½ .37½	.31½	.40½	.34½	.58½
tks, frt all'd, drs	gal. *p*	.26½ .30½	.26½	.32½	.28½	.44½
Synthetic, frt all'd, east of Rocky M., drs	gal. *p*	.42 .51	.42	.51	.42	.59½
tks, frt all'd	gal.	.36 .39½	.36	.39½	.36	.49½
West of Rocky M., frt all'd, drs	gal. *p*	... .46	...	.46	.46	.58
tks, frt all'd	gal. *p*	... .39½	...	.39½	.39½	.51
Anthraquinone	lb.	.65 .67	.65	.67	.65	.67
Butyl Ketone, tks	lb.	... .10½	...	.10½	...	.10½
Chloride, 90 lb cyl	lb.	.32 .40	.32	.40	.32	.43
Ethyl Ketone, tks, frt all'd	lb.	... .05½	.05½	.06	...	.07½
50 gal drs, frt all'd c-l	lb.	... .06½	.06½	.07	...	...
Formate, drs, frt all'd	lb.	.35 .36	.35	.36	.35	.39
Hexyl Ketone, pure, drs	lb.	... .60	...	.60	...	.60
Lactate, drs, frt all'd	lb.	... .30	...	.30	...	.30
Propyl carbinol, drs	lb.	.60 .75	.60	.75	.60	.75
Mica, dry grd, bgs, wks	lb.	... 35.00	...	35.00	...	35.00
Michler's Ketone, kgs	lb.	... 2.50	...	2.50	...	2.50
Molasses, blacksrap, tks, f.o.b. NY	gal.	... .07	...	.07	.07	.07¼
Monoamylamine, c-l, drs, wks	lb.	.52 1.00	.52	1.00	.52	1.00
Monobutylamine, lcl, drs, wks	lb.	... .65	...	.65	...	...
Monochlorobenzene, see Chlorobenzene, mono.						
Monoethanolamine, tks, wks	lb.	... .23	...	.23	.25	.30
Monomethylamine, drs, frt all'd, E. Mississippi, c-l	lb.	... .65	...	.65	...	.65
Monomethylparaminosulfate, 100 lb drs	lb.	3.75 4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls	lb.	.03¾ .04¼	.03¾	.04¼	...	.04¼
50% Solid, 50 lb boxes	lb.	.04⅜ .05	.04⅜	.06¼	.06	.06¼
J1 bgs	ton	... 28.50	28.00	30.00	26.50	30.00
J2 bgs	ton	... 21.00	21.00	22.00	19.00	22.50
R2 bgs	ton	... 20.50	20.50	22.00	18.75	22.00

NAPHTHA

Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks	gal.	... .31	...	.31	...	.31
drs, c-l	gal.	... .36	...	.36	...	.36

NAPHTHALENE

Naphthalene, dom, crude, bgs, wks	lb.	2.35 2.70	2.35	2.70	2.00	3.00
Imported, cif, bgs	lb.	1.90 2.25	1.90	2.25	2.20	3.00
Balls, flakes, pks	lb.	... .07½	.07½	.08	...	.08
Balls, ref'd, bbls, wks	lb.	... .06¾	.06¾	.07¼	...	.07¼
Flakes, ref'd, bbls, wks	lb.	... .06¾	.06¾	.07¼	...	.07¼
Nickel Carbonate, bbls	lb.	.36 .37½	.36	.37½	.36	.37½
Chloride, bbls	lb.	.18 .20	.18	.20	.18	.20
Metal ingot	lb.	... .35	...	.35	...	.35
Oxide, 100 lb kgs, NY	lb.	.35 .37	.35	.37	.35	.37
Salt, 400 lb bbls, NY	lb.	.13 .13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY	lb.	.13 .13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs	lb.	... .76	...	.76	...	.76
Nitre Cake, blk	ton	... 16.00	...	16.00	...	16.00
Nitrobenzene, redistilled, 1000 lb drs, wks	lb.	.08 .10	.08	.10	.08	.10
tks	lb.	... .07½	...	.07½	...	.07½
Nitrocellulose, c-l, l-c-l, wks	lb.	.22 .29	.22	.29	.26	.29
Nitrogenous Mat'l, bgs, imp	unit	... 2.40	2.40	2.65	2.55	3.55
dom, Eastern wks	unit	... 2.60	2.50	2.75	2.50	4.25
dom, Western wks	unit	... 2.25	2.20	2.35	2.25	3.75
Nitronaphthalene, 550 lb bbls	lb.	.24 .25	.24	.25	.24	.25
Nutgalls Alleppo, bgs	lb.	no prices	...	...	.20	.22
Chinese, bgs	lb.	no prices	...	...	.20	.22

OAK BARK

Oak Bark Extract, 25%, bbls	lb.	... .03⅛	...	.03⅛	...	.03⅛
tks	lb.	... .02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks	lb.	.16 .17	.16	.17	.16	.17

o Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

Mangrove Octyl Acetate

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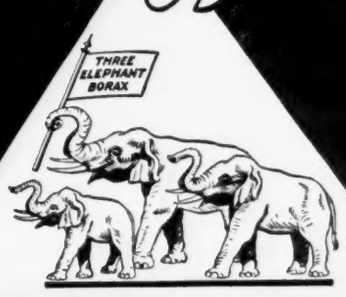

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Orange-Mineral
Phenylhydrazine Hydrochloride

Prices

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Orange-Mineral, 1100 lb cks NY lb.	...	.10	.10	.10¼	.12¾
Orthoaminophenol, 50 lb kgs lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.70	.74	.70	.74	.70	.74
Orthochlorophenol, drs lb.	.35	.75	.35	.75	.35	.75
Orthocresol, drs, wks lb.	.13½	.14½	.13½	.14½	.13½	.14½
Orthodichlorobenzene, 1000 lb drs lb.	.06	.07	.06	.07	.05	.07
Orthonitrochlorobenzene, 1200 lb drs, wks lb.	.15	.18	15	.18	.28	.29
Orthonitroparachlorphenol, tins lb.	...	.75	...	.75	.70	.75
Orthonitrophenol, 350 lb drs lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, 1000 lb drs, wks lb.	.08	.10	.08	.10	.07	.10
Orthotoluidine, 350 lb bbls, l-c-l lb.	.16	.17	.16	.17	.14	.17
Osage Orange, cryst, bbls lb.	.17	.25	.17	.25	.17	.25
51° liquid lb.	.07	.08	.07	.08	.07	.08
Paraffin, rfd, 200 lb cs slabs 122-127° M P lb.	.043	.0435	.043	.041½	.0445	.04¾
128 132° M P lb.	.0445	.0455	.0445	.049	.04¾	.049
133-137° M P lb.	.05	.05¼	.05	.05¾	.05½	.05¾
Para aldehyde, 99%, tech, 110-55 gal drs, delv lb.	...	.16	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs lb.	.30	.45	.30	.45	.30	.45
Dichlorobenzene, 200 lb drs, wks lb.	.11	.12	.11	.12	.11	.20
Formaldehyde, drs, wks lb.	.34	.35	.34	.35	.34	.35
Nitroacetanilid, 300 lb bbls lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks lb.	.45	.47	.45	.47	.45	.47
Nitrochlorobenzene, 1200 lb drs, wks lb.	.15	.16	.15	.16	.23½	.24
Nitro-orthotoluidine, 300 lb bbls lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.35	.37	.35	.37	.35	.37
Nitrosodimethylaniline, 120 lb bbls lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.35	...	.35	...	.35
Phenylenediamine, 350 lb bbls lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls lb.	.70	.75	.70	.75	.70	.75
tks, wks lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks lb.	.56	.58	.56	.58	.56	.58
Paris Green, dealers, drs lb.	.23	.26	.23	.26½	.22	.26½
Pentane, normal, 28-38° C, group 3, tks gal.	...	.08½	...	.08½	.08½	.09½
drs, group 3 gal.	.11½	.16	.11½	.16	.12½	.16
Perchlorethylene, 100 lb drs, frt all'd lb.	...	.10½	...	.10½	...	.10½
Petrolatum, dark amber, bbls lb.	.02¾	.03⅞	.02¾	.03⅞	.02⅝	.03
Light, bbls lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜
Medium, bbls lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02⅞	.03⅛
Dark green, bbls lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
Red, bbls lb.	.02¼	.03⅝	.02½	.03⅝	.02⅛	.03¼
White, lily, bbls lb.	.05½	.07⅛	.05½	.07⅛	.06	.06¼
White, snow, bbls lb.	.06½	.08⅛	.06½	.08⅛	.07	.07¼
Petroleum Ether, 30-60°, group 3, tks gal.	...	.13	...	.13	...	.13
drs, group 3 gal.	.14	.17	.14	.17	.15	.17

PETROLEUM SOLVENTS AND DILUENTS

Cleaners naphthas, group 3, tks, wks gal.	...	.06⅜	.06⅜	.07⅜	.06⅞	.07⅞
East Coast, tks, wks gal.	...	.10	...	.10	.09½	10
Hydrogenated, naphthas, frt all'd East, tks gal.	...	.16	...	.16	...	.16
No. 2, tks gal.	...	.18	...	.18	...	.18
No. 3, tks gal.	...	.16	...	.16	...	.16
No. 4, tks gal.	...	.18	...	.18	...	.18
Lacquer diluents, tks, Bayonne gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks gal.	...	.07⅜	.07⅜	.08⅜	.07⅞	.08⅞
Naphtha, V.M.P., East, tks, wks gal.	...	.10	.10	.11	.10	.11
Group 3, tks, wks gal.	...	.06⅜	.06⅜	.07⅜	.06⅞	.07⅞
Petroleum thinner, 43-47, East, tks, wks gal.	...	.09½	...	.09½	.09	.10
Group 3, tks, wks gal.	...	.05⅜	.05⅜	.06⅜	.05⅞	.06⅞
Rubber Solvents, stand grd, East, tks, wks gal.	.09½	.10	.09½	.10	.09½	.10
Group 3, tks, wks gal.	...	.06⅜	.06⅜	.07⅜	.06⅞	.07⅞
Stoddard Solvent, East, tks, wks gal.	.09½	.10	.09½	.10	.09½	.10
Group 3, tks, wks gal.	...	.06⅜	.05⅞	.06⅞	.06⅜	.07⅜
Phenol, 250-100 lb drs lb.	.14½	.15½	.14½	.15½	.13¼	.15½
tks, wks lb.	...	.13½	...	.13½	.12¾	.13½
Phenyl-Alpha-Naphthylamine, 100 lb kgs lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs lb.	...	.17	...	.17	.16	.17
Phenylhydrazine Hydrochloride, com lb.	...	1.50	...	1.50	...	1.50

Current

Phloroglucinol
Rosin Oil

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Phloroglucinol, tech, tins	lb.	15.00	15.00	16.50	15.00	16.50
CP, tins	lb.	20.00	20.00	22.00	20.00	22.00
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis	ton	...	...	1.85	...	1.85
70% basis	ton	...	...	2.35	...	2.35
72% basis	ton	...	...	2.85	...	2.85
75-74% basis	ton	...	...	3.85	...	3.85
75% basis	ton	...	...	5.50	...	5.50
Tennessee, 72% basis	ton	...	...	4.50	...	4.50
Phosphorus Oxychloride 175						
lb cyl	lb.	.16	.16	.20	.16	.20
Red, 110 lb cases	lb.	.40	.40	.44	.40	.44
Sesquisulfide, 100 lb cs.	lb.	.38	.38	.44	.38	.44
Trichloride, cyl	lb.	.15	.15	.18	.15	.20
Yellow, 110 lb cs, wks	lb.	.24	.24	.30	.24	.33
Phthalic Anhydride, 100 lb						
drs, wks	lb.	...	.14½	...	.14½	.14½ .15½
Pine Oil, 55 gal drs or bbls						
Destructive dist	lb.	.52	.52	.55	.49	.65
Steam dist wat wh bbls	gal.	...	...	.59	.59	.79
tks	gal.	...	...	.54	.54	.74
Pitch Hardwood, wks	ton	18.25	18.25	18.75	15.00	18.75
Coaltar, bbls, wks	ton	...	...	19.00	...	19.00
Burgundy, dom, bbls, wks	lb.	.05½	.05½	.06½	.03½	.06½
Imported	lb.	.15	.15	.16	.11	.16
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls	bbl.	6.00	5.75	6.25	5.75	6.50
Stearin, drs	lb.	.03	.03	.04½	.03	.04½
Platinum, ref'd	oz.	32.00	32.00	38.00	32.00	68.00
POTASH						
Potash, Caustic, wks, sol	lb.	.06¼	.06¼	.06½	.06¼	.06½
flake	lb.	.07	.07	.07½	.07	.07½
Liquid, tks	lb.	...	...	.02⅞	...	.02⅞
Manure Salts, imported						
30% basis, blk	unit	...	...	.58½	.55	.58½
Potassium Abietate, bbls	lb.	...	...	.13	...	...
Acetate, tech, bbls, delv	lb.	...	.26	.28	.26	.28
Bicarbonate, USP, 320 lb						
bbls	lb.	...	.18	...	.18	.09 .18
Bichromate Crystals, 725 lb						
cks*	lb.	.08¾	.08¾	.09¼	.08¾	.09
Binoxalate, 300 lb bbls	lb.	...	...	.23	...	.23
Bisulfate, 100 lb kgs	lb.	.15½	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800						
lb cks	lb.	.06½	.06½	.07	.06½	.07
liquid, tks	lb.	...	...	.02⅞	.02¾	.02⅞
drs, wks	lb.	.03	.03	.03½	.02⅞	.03½
Chlorate crys, 112 lb kgs,						
wks	lb.	.09¼	.09¼	.09½	.09¼	.09½
gran, kgs	lb.	.12	.12	.13	.12	.13
powd, kgs	lb.	.08½	.08¼	.08¾	.08½	.08¾
Chloride, crys, bbls	lb.	.04	.04	.04¾	.04	.04¾
Chromate, kgs	lb.	.19	.19	.28	.28	.29
Cyanide, 110 lb cases	lb.	.55	.55	.57½	.55	.57½
Iodide, 75 lb bbls	lb.	.93	.93	1.00	.93	1.15
Metabisulfite, 300 lb bbls	lb.	.13	.13	.15	.11	.15
Muriate, bgs, dom, blk	unit	...	.53½	...	.50	.53½
Oxalate, bbls	lb.	.25	.25	.26	.25	.26
Perchlorate, kgs, wks	lb.	.09½	.09½	.11½	.09½	.11
Permanganate, USP, crys,						
500 & 1000 lb drs, wks	lb.	.18½	.18½	.19½	.18½	.19½
Prussiate, red, bbls	lb.	.35	.35	.37	.35	.37
Yellow, bbls	lb.	.15	.15	.16	.15	.18
Sulfate, 90% basis, bgs	ton	...	38.00	...	38.00	... 36.25
Titanium Oxalate, 200 lb						
bbls	lb.	.35	.35	.40	.33	.40
Pot & Mag Sulfate, 48% basis						
bgs	ton	...	25.75	...	25.75	24.75 25.75
Propane, group 3, tks	lb.	.03	.03	.04⅛	.03	.04⅛
Putty, coml, tubs	100 lb.	...	2.25	2.25	2.90	2.90 3.00
Linseed Oil, kgs	100 lb.	...	4.00	4.00	4.65	4.65 4.75
Pyrethrum, conc liq:						
2.4% pyrethrins, drs, frt all'd	gal.	6.40	5.00	6.75	4.15	5.25
3.6% pyrethrins, drs, frt all'd	gal.	9.60	7.65	9.95	6.10	7.85
Flowers, coarse, Japan,						
bgs	lb.	...	.23¾	.18	.23¾	.12¾ .18
Fine powd, bbls	lb.	...	.25¼	.19	.25¼	.14 .19
Pyridine, denat, 50 gal drs	gal.	...	1.55	...	1.55	1.30 1.55
Refined, drs	lb.	...	.45	...	.45	... ...
Pyrites, Spanish cif Atlantic						
ports, blk	unit	.12	.13	.12	.13	.12 .13
Pyrocatechin, CP, drs, tins	lb.	2.15	2.75	2.15	2.75	2.15 2.75
Quebracho, 35% liq tks	lb.	...	.03	...	.03	.02⅞ .03
450 lb bbls, c-l	lb.	...	.03½	...	.03½	.03½ .03⅞
Solid, 63%, 100 lb bales						
cif	lb.	...	.04	...	.04	.03⅞ .04
Clarified, 64%, bales	lb.	...	.04¼	...	.04¼	.04¼ .04⅜
Quercitron, 51 deg liq, 450 lb						
bbls	lb.	.06	.06	.06½	.06	.06½
Solid, drs	lb.	.10	.12	.10	.12	.10 .12
R SALT						
R Salt, 250 lb bbls, wks	lb.	.52	.52	.55	.52	.55
Resorcinol tech, cans	lb.	.75	.75	.80	.75	.80
Rochelle Salt, cryst	lb.	.17	.15	.17½	.14½	.15½
Powd, bbls	lb.	.16	.16	.18½	.13½	.16½
Rosin Oil, bbls, first run	gal.	.45	.45	.60	.52	.73
Second run	gal.	.47	.47	.62	.54	.75
Third run, drs	gal.	.51	.53	.66	.58	.79

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Rosins
Sodium Naphthionate

Prices

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:†						
B		4.85	4.85	6.00	5.50	10.00
D		5.10	5.10	6.00	5.50	10.35
E		5.15	5.15	6.00	5.75	10.25
F		5.65	5.65	7.00	6.87½	10.80
G		5.95	5.90	7.05	6.87½	10.85
H		6.00	6.00	7.15	6.90	10.85
I		6.00	6.00	7.15	6.95	10.90
K		6.00	6.15	7.25	6.95	10.90
M		6.02½	6.02½	7.40	7.05	11.00
N		6.55	6.40	7.50	7.10	11.05
WG		7.20	7.20	8.45	7.65	11.75
WW		7.70	7.70	9.15	8.00	13.75
Rosins, Gum, Savannah (280 lb unit):†						
B		3.45	3.45	4.60	4.25	8.75
D		3.70	3.70	4.60	4.25	9.00
E		3.75	3.75	4.60	4.25	9.10
F		4.25	4.25	5.60	5.50	9.55
G		4.55	4.50	5.65	5.60	9.60
H		4.60	4.60	5.75	5.70	9.60
I		4.60	4.60	5.85	5.70	9.65
K		4.60	4.60	6.00	5.70	9.65
M		4.62½	4.62½	6.15	5.80	9.75
N		5.05	5.00	6.20	5.85	9.75
WG		5.80	5.80	7.05	6.40	10.50
WW		6.30	6.30	7.75	6.75	12.50
X		6.30	6.30	7.75	6.75	12.50
Rosin, Wood, c-l, FF grade, NY		5.55	5.40	6.40	6.40	10.72
Rotten Stone, bgs mines	ton	35.00	...	35.00	...	35.00
Imported, lump, bbls	lb.	.12	...	.12	...	...
Powdered, bbls	lb.	.08½	.10	.08½	.10	...	...

SAGO FLOUR

Sago Flour, 150 lb bgs	lb.	.02½	.03½	.02½	.03¾	.02¾	.03¾
Sal Soda, bbls, wks	100 lb.	...	1.20	...	1.20	1.15	1.20
Salt Cake, 94-96%, c-l, wks	ton	19.00	23.00	19.00	23.00	19.00	23.00
Chrome, c-l, wks	ton	11.00	12.00	11.00	12.00	11.00	12.00
Saltpetre, gran, 450-500 lb bbls	lb.	.06½	.069	.06½	.069	.06	.069
Cryst, bbls	lb.	.07½	.0865	.07½	.0865	.07	.0865
Powd, bbls	lb.	.07½	.079	.07½	.079	.07	.079
Satin, White, pulp, 550 lb bbls	lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Schaeffer's Salt, kgs	lb.	.46	.48	.46	.48	.46	.48
Shellac, Bone dry, bbls	lb. *r*	.16½	.17	.16½	.17½	.17	.22
Garnet, bgs	lb.	.13½	.14	.13½	.15	.14	.17
Superfine, bgs	lb. *s*	.11½	.12	.11½	.13½	.13	.18½
T. N., bgs	lb. *s*	.11	.11½	.11	.12½	.12	.14½
Silver Nitrate, vials	oz.	...	.31½	.31½	.34⅜	.32½	.35½
Slate Flour, bgs, wks	ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks	100 lb.	...	1.10	...	1.10	...	1.10
58% light, bgs	100 lb.	...	1.08	...	1.08	...	1.08
blk	100 lb.	...	.90	...	.90	...	.90
paper bgs	100 lb.	...	1.05	...	1.05	...	1.05
bbls	100 lb.	...	1.35	...	1.35	...	1.35
Caustic, 76% grnd & flake, drs	100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs	100 lb.	...	2.30	...	2.30	...	2.30
Liquid sellers, tks	100 lb.	...	1.97½	...	1.97½	...	1.97½
Sodium Abietate, drs	lb.	...	.10	.10	.13	.08	.13
Acetate, 60% tech, gran, powd, flake, 450 lb bbls, wks	lb.	.04	.05	.04	.05	.04¼	.05
anhyd, drs, delv	lb.	...	.08¼	...	.08¼	...	...
Alginate, drs	lb.	...	.69	...	.69	.64	.69
Antimoniate, bbls	lb.	.12⅞	.13¼	.12⅞	.15¼	.13¾	.16¼
Arsenate, drs	lb.	.08	.08½	.08	.08½	.08	.11½
Arsenite, liq, drs	gal.	.30	.33	.30	.33	.33	.40
Dry, gray, drs, wks	lb.	.07½	.09½	.07½	.09½	...	...
Benzoate, USP, kgs	lb.	.46	.48	.46	.48	.46	.48
Bicarb, powd, 400 lb bbl, wks	100 lb.	...	1.85	...	1.85	1.75	1.85
Bichromate, 500 lb cks, wks*	lb.	.06¾	.07¼	.06¾	.07¼	.06½	.07¼
Bisulfite, 500 lb bbl, wks	lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol bbls, wks	100 lb.	1.40	1.80	1.40	1.80	...	...
Chlorate, bgs, wks	lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Cyanide, 96-98%, 100 & 250 lb drs, wks	lb.	.14	.15	.14	.17½	.15½	.17½
Diacetate, 33-35% acid, bbls, lcl, delv	lb.	...	.09	...	.09	...	...
Fluoride, white 90%, 300 lb bbls, wks	lb.	.07½	.08¼	.07½	.08¼	.07½	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks	lb.	.16	.17	.16	.17	.16	.17
Hyposulfite, tech, pea crys 375 lb bbls, wks	100 lb.	...	2.80	2.50	2.80	2.50	3.00
Tech, reg cryst, 375 lb bbls, wks	100 lb.	2.45	2.80	2.40	2.80	2.40	2.75
Iodide	lb.	1.90	1.95	1.90	1.95	1.90	1.95
Metal, drs, 280 lbs	lb.	...	.19	...	.19	...	.19
Metanilate, 150 lb bbls	lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks	100 lb.	...	2.20	2.15	2.20	...	2.15
cryst, bbls, c-l, wks	100 lb.	...	2.90	2.75	2.90	...	2.75
Monohydrate, bbls	lb.	...	.023	...	.023	...	.023
Naphthenate, drs	lb.	.12	.19	.12	.19	.09	.19
Naphthionate, 300 lb bbl	lb.	.52	.54	.52	.54	.52	.54

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. * Spot price is ½c higher; † Closing prices Nov. 26th.

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Sodium (continued):					
Nitrate, 92%, crude, 200 lb bgs, c-l, NY ton	... 28.30	... 28.30	26.80		28.30
100 lb bgs ton	... 29.00	... 29.00	27.50		29.00
Bulk ton	... 27.00	... 27.00	25.50		27.00
Nitrite, 500 lb bbls lb.	.06¾ .11½	.06¾	.11½	.07	.10
Orthochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25 .27	.25	.27	.25	.27
Perborate, drs, 400 lbs lb.	.14¾ .15¼	.14¾	.15¼	.14¾	.15¼
Peroxide, bbls, 400 lb lb.	... .17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	... 2.05	...	2.05	1.90	2.05
bgs, wks 100 lb.	... 1.85	...	1.85	1.70	1.85
Tri-sodium, tech, 325 lb bbls, wks 100 lb.	... 2.20	...	2.20	2.05	2.20
bgs, wks 100 lb.	... 2.00	...	2.00	1.85	2.00
Picramate, 160 lb kgs lb.	.65 .67	.65	.67	.65	.67
Prussiate, Yellow, 350 lb bbl. wks lb.	.10 .11½	.10	.11½	.10	.11½
Pyrophosphate, anhyd, 100 lb bbls lb.	... .10	...	.10	...	.10
Sesquisilicate, drs, c-l, wks 100 lb.	... 3.00	...	3.00	...	...
Silicate, 60°, 55 gal drs, wks 100 lb.	1.65 1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	... .80	...	.80	...	.80
tks, wks 100 lb.	... .65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY lb.	.05¾ .06	.05¾	.06½	.05¾	.07
Stannate, 100 lb drs lb.	.26 .29	.26	.32	.28	.44
Stearate, bbls lb.	... .24	...	.24	.19	.24
Sulfanilate, 400 lb bbls lb.	.16 .18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bgs* c-l, wks 100 lb. †	1.45 1.90	1.45	1.90	1.45	1.90
Sulfide, 80% cryst, 440 lb bbls, wks lb.	... .02¼	...	.02¼	...	.02¼
Solid, 650 lb drs, c-l, wks lb.	... .03	...	.03	...	.02
Sulfite, cryst, 400 lb bbls, wks lb.	.023 .02½	.023	.02½	.023	.02½
Sulfocyanide, drs lb.	.28 .47	.28	.47	.28	.47
Sulforicinoleate, bbls lb.	... .12	...	.12	...	.12
Tungstate, tech, crys, kgs lb.	... nom.	...	...	.85	.90
Sorbitol, com, solut., wks, c-l drs, wks lb.	... .18	.18	.19	...	.25
Spruce Extract, ord, tks lb.	... .01⅛	...	.01⅛	.01	.01⅛
Ordinary, bbls lb.	... .01⅝	...	.01⅝	.01½	.01⅝
Super spruce ext, tks lb.	... .01⅜	...	.01⅜	.01⅜	.01⅝
Super spruce ext, bbls lb.	... .01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs lb.	... .04	...	.04	.04	.04¼
Starch, Pearl, 140 lb bgs 100 lb.	2.60 2.80	2.60	3.18	2.93	4.53
Powd, 140 lb bgs 100 lb.	2.70 2.90	2.70	3.28	3.03	4.63
Potato, 200 lb bgs lb.	.04 .05	.03½	.05½	.04½	.05½
Imp, bgs lb.	.05 .06	.05	.06	.05	.06
Rice, 200 lb bbls lb.	.06¼ .07¼	.06¼	.07¼	...	.07¼
Wheat, thick, bgs lb.	.06¼ nom.	.06¼	.07	.07	.08½
Strontium carbonate, 600 lb bbls, wks lb.	.07¼ .07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.08¼ .09¼	.07¾	.09¼	.07¾	.08¾
Sucrose octa-acetate, den, grd, bbls, wks lb.	... .45	...	.45	...	.45
tech, bbls, wks lb.	... .40	...	.40	...	.40
Sulfur, crude, f.o.b. mines ton	18.00 19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs 100 lb.	1.65 2.35	1.65	2.35	1.65	2.35
bbls 100 lb.	1.95 2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs 100 lb.	2.20 2.80	2.20	2.80	2.20	2.80
bbls 100 lb.	2.55 3.15	2.55	3.15	2.55	3.15
Extra fine, bgs 100 lb.	2.85 3.00	2.85	3.00	2.85	3.00
Superfine, bgs 100 lb.	2.65 2.80	2.65	2.80	2.65	2.80
bbls 100 lb.	2.25 3.10	2.25	3.10	2.25	3.10
Flowers, bgs 100 lb.	3.00 3.75	3.00	3.75	3.00	3.75
bbls 100 lb.	3.35 4.10	3.35	4.10	3.35	4.10
Roll, bgs 100 lb.	2.35 3.10	2.35	3.10	2.35	3.10
bbls 100 lb.	2.50 3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks lb.	.03 .04	.03	.04	.02½	.04
Sulfur Dioxide, 150 lb cyl lb.	.07 .09	.07	.09	.07	.09
Multiple units, wks lb.	.04½ .07	.04½	.07	.04½	.07
tks, wks lb.	.04 .05	.04	.05	.04	.05
Refrigeration, cyl, wks lb.	.16 .17	.16	.17	.15	.17
Multiple units, wks lb.	.07½ .10	.07½	.10	.07½	.10
Sulfuryl Chloride lb.	.15 .40	.15	.40	.15	.40
Sumac, Italian, grd ton	... 64.00	62.00	66.00	58.50	65.00
Extract, 42°, bbls lb.	.05¼ .06¼	.05¼	.06¼	.05¼	.06¼
Superphosphate, 16% bulk, wks ton	... 8.50	8.50	9.00	8.25	9.00
Run of pile ton	... 8.00	8.00	8.50	8.00	8.50
Triple, 44-45%, a. p. a. bulk, wks, Balt. unit ton	... .85	...	.85	.70	.85
Talc, Crude, 100 lb bgs, NY ton	13.00 15.00	13.00	15.00	13.00	15.00
Ref'd, 100 lb bgs, NY ton	14.00 16.00	14.00	16.00	14.00	16.00
French, 220 lb bgs, NY ton	23.00 30.00	23.00	30.00	23.00	30.00
Ref'd, white, bgs, NY ton	45.00 60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	60.00 62.00	60.00	62.00	60.00	62.00
Ref'd, white, bgs, NY ton	65.00 70.00	65.00	70.00	65.00	70.00
Tankage Grd, NY unit ‖	... 2.50	2.50	3.00	3.00	4.40
Ungrd unit ‖	... 2.60	2.60	2.90	2.80	4.35
Fert grade, f.o.b. Chgo unit ‖	... 2.45	2.45	2.75	2.75	4.00
South American cif unit ‖	... 3.00	3.00	3.45	3.15	4.25
Tapioca Flour, high grade, bgs lb.	.03¼ .05½	.03¼	.05½	.03¼	.05½
Tar Acid Oil, 15%, drs gal.	.22½ .25½	.22½	.25½	.21	.25½
25%, drs gal.	.26½ .29½	.26½	.29½	.24½	.29½
Tar, pine, delv, drs gal.	... .26	...	.26	...	.26
tks, delv, E. cities gal.	... .20	...	.20	...	.20
Tartar Emetic, tech, bbls lb.	.26¾ .27	.26¾	.27	.24¾	.27
USP, bbls lb.	.32 .32½	.32	.32½	.30	.32½

† Bags 15c lower; ‖ + 10; *Bbls. are 20c higher.

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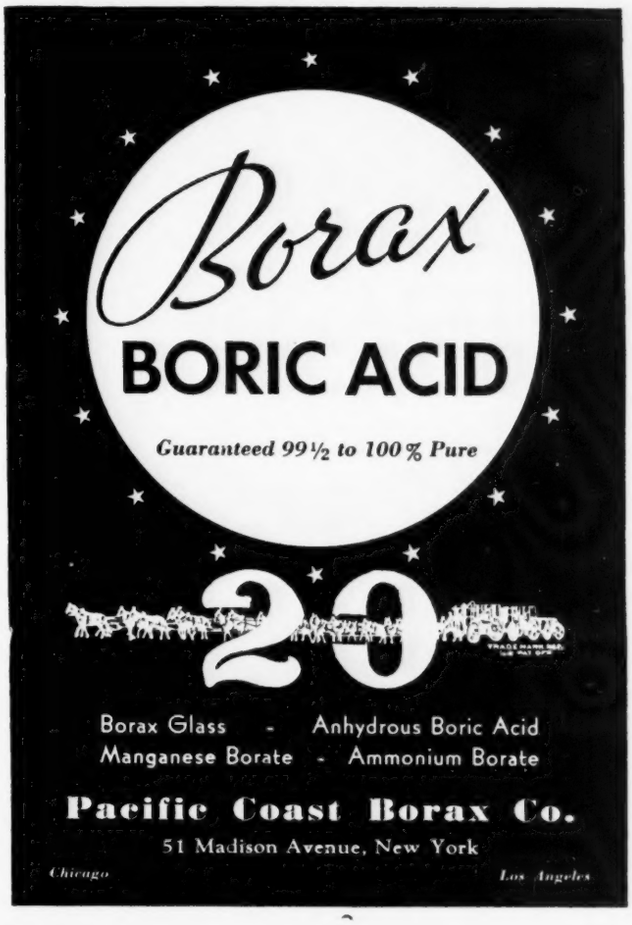

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Terpineol
Zinc Metal

Prices

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Terpineol, den grade, drs lb.	...	.17	...	.17	.13¾	.14¾
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachloroethylene, drs, tech lb.	...	.09½	...	.09½	...	.10½
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbls lb.	.20	.25	.20	.25	.20	.25
Tin, crystals, 500 lb bbls, wks lb.	.31½	.32	.31½	.34½	.33	.46
Metal, NY lb.	...	.36¼	.36¼	.4295	.41	.66
Oxide, 300 lb bbls, wks lb.	.46	.48	.46	.50	.48	.62
Tetrachloride, 100 lb drs, wks lb.	...	.19	.19	.21¾	.21	.32
Titanium Dioxide, 300 lb bbls lb.	.16¼	.17	.16¼	.17	.16¼	.17
Barium Pigment, bbls lb.	.06⅛	.06⅜	.06⅛	.06⅜	.06	.06⅜
Calcium Pigment, bbls lb.	.06⅛	.06⅜	.06⅛	.06⅜	.06	.06⅜
Toluidine, mixed, 900 lb drs, wks lb.	.26	.27	.26	.27	.26	.27
Toluol, 110 gal drs, wks gal.	...	.35	...	.35	...	.35
8000 gal tks, frt all'd gal.	...	.30	...	.30	...	.30
Toner Lithol, red, bbls lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls lb.	.75	.80	.75	.80	...	.75
Toluidine, bgs lb.	...	1.35	...	1.35	...	1.35
Triacetin, 50 gal drs, wks lb.	...	.36	...	.36	...	.36
Triamyl Borate, lcl, drs, wks lb.	...	.27	...	.27	...	.27
Triamylamine, c-l, drs, wks lb.	.77	1.25	.77	1.25	.77	1.25
Tributylamine, lcl, drs, wks lb.	...	.70	...	.70	...	.
Tributyl citrate, drs, frt all'd lb.	...	.45	...	.45	...	.45
Tributyl Phosphate, frt all'd lb.	...	.50	...	.50	...	.50
Trichlorethylene, 600 lb drs, frt all'd E. Rocky Mts lb.	.089	.094	.089	.094	.089	.094
Tricresyl phosphate, tech, drs lb.	.24½	.39	.24½	.39	.22½	.26½
Triethanolamine, 50 gal drs wks lb.	.21	.22	.21	.22	.21	.30
tks, wks lb.	...	.20	...	.20	.20	.25
Triethylene glycol, drs, wks lb.	...	.26	...	.26	...	...
Trihydroxyethylamine Oleate, bbls lb.	...	.30	...	.30	...	...
Stearate, bbls lb.	...	.30	...	.30	...	...
Trimethylamine, c-l, drs, frt all'd E. Mississippi lb.	...	1.00	...	1.00	...	1.00
Triphenylguanidine lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs lb.	.34	.36	.34	.36	...	...
Tripoli, airfloated, bgs, wks ton	26.00	30.00	26.00	30.00	25.00	30.00
Turpentine (Spirits), c-l, NY dock, bbls gal.	.29	.29½	.29	.31½	.31	.47
Savannah, bbls gal.	.23	.23½	.23	.30¾	.25	.42
Jacksonville, bbls gal.	...	.23¼	.23¼	.30¾	.25	.41
Wood Steam dist, bbls, c-l, NY gal.	...	.27	.27	.31	.30	.44
Wood, dest dist, c-l, drs, delv E. cities gal.	...	.36	.33	.36	...	...
Urea, pure, 112 lb cases lb.	.14½	.15½	.14½	.15½	.14½	.15½
Fert grade, bgs, c.i.f. ton	...	...	...	...	...	...
c.i.f. S.A. points ton	95.00	110.00	95.00	110.00	95.00	110.00
Dom, f.o.b., wks ton	95.00	101.00	95.00	101.00	95.00	101.00
Urea Ammonia liq 55% NH_3, tks unit	...	1.04	...	1.04	1.00	1.04
Valonia beard, 42%, tannin bgs ton	...	49.00	49.00	52.00	35.00	52.00
Cups, 32% tannin, bgs ton	35.00	37.00	35.00	37.50	31.50	36.00
Extract, powd, 63% lb.	...	.06	...	.06	...	...
Vanillin, ex eugenol, 25 lb tins, 2000 lb lots lb.	...	2.75	2.75	3.10	3.10	3.65
Ex-guaiacol lb.	...	2.65	2.65	3.00	3.00	3.55
Vermilion, English, kgs lb.	1.45	1.54	1.45	1.69	1.60	1.90
Wattle Bark, bgs ton	39.75	41.75	39.75	41.75	31.00	43.75
Extract, 60°, tks, bbls lb.	...	.04⅜	.04⅜	.04⅝	.03⅝	.04⅝
WAXES						
Wax, Bayberry, bgs lb.	.16⅞	.17	.16⅞	.17	.16½	.17½
Bees, bleached, white 500 lb slabs, cases lb.	.38	.39	.35	.45	.38	.45
Yellow, African, bgs lb.	.24	.25	.24	.26	.25	.30
Brazilian, bgs lb.	.25½	.27½	.25½	.29	.27	.34
Chilean, bgs lb.	.25½	.27½	.25½	.29	.27	.34
Refined, 500 lb slabs, cases lb.	.29	.32	.32	.39	.29½	.39
Candelilla, bgs lb.	.14½	.15	.13½	.15	.13	.16½
Carnauba, No. 1, yellow, bgs lb.	.38	.39½	.38	.44	.42	.49
No. 2, yellow, bgs lb.	.36	.36½	.36	.42	.41	.46½
No. 2, N. C., bgs lb.	.35½	.36	.35½	.40	.38	.43
No. 3, Chalky, bgs lb.	.31½	.33	.31½	.35	.33	.40
No. 3, N. C., bgs lb.	.31½	.32	.31½	.35½	.34	.43
Ceresin, dom, bgs lb.	.08½	.11½	.08½	.11½	.08	.12
Japan, 224 lb cases lb.	.10	.10¼	.09¾	.10½	.09½	.11¼
Montan, crude, bgs lb.	.11	.12	.11	.12	.11	.12
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.23	.24	.23	.24	.23	.24
Cakes, cases lb.	.24	.25	.24	.25	.24	.25
Whiting, chalk, com, 200 lb bgs c-l, wks ton	12.00	14.00	12.00	14.00	12.00	14.00
Gilders, bgs, c-l, wks ton	...	15.00	...	15.00	...	15.00
Wood Flour, c-l, bgs ton	20.00	33.00	20.00	33.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks gal.	...	.33	...	.33	...	.33
Coml, tks, wks, frt all'd gal.	...	.30	...	.30	...	.30
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.35	.36
Zinc Acetate, tech, bbls, lcl, delv lb.	...	.21	...	.21	...	...
Arsenate, bgs, frt all'd lb.	.12½	.13	.12½	.13½	...	...
Arsenite, bgs, frt all'd lb.	.12½	.13	.12½	.13	...	...
Carbonate tech, bbls, NY lb.	.14	.15	.14	.15	.12	.15
Chloride fused, 600 lb drs, wks lb.	.04½	.046	.04½	.046	.04½	.046
Gran, 500 lb drs, wks lb.	.05	.05¾	.05	.05¾	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.25	...	2.25	2.00	2.25
Cyanide, 100 lb drs lb.	...	.33	.33	.38	.36	.38
Dust, 500 lb bbls, c-l, delv lb.	...	.0615	.0615	.0740	.0740	.094
Metal, high grade slabs, c-l, NY 100 lb.	...	4.50	4.35	5.35	5.35	7.85
E. St. Louis 100 lb.	...	4.15	4.00	5.00	5.00	7.50

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Zinc (continued):					
Oxide, Amer, bgs, wks lb.	.06¼	.07½	.06	.07½	.05¼	.07¾
French 300 lb bbls, wks lb.	.06¼	.07¾	.06¼	.07¾	.05½	.07¾
Palmitate, bbls lb.	.23	.25	.23	.25	.23	.25
Resinate, fused, pale, bbls lb.	...	.10	...	.10	.09	.10
Stearate, 50 lb bbls lb.	.20	.23	.20	.23	.20	.23
Zinc Sulfate, crys, 400 lb bbl, wks lb.	...	.029	.029	.033	.028	.033
Flake, bbls lb.	...	.0325	.0325	.0375	.032	.0375
Sulfide, 500 lb bbls, delv lb.	.09¼	.09¾	.09¼	.09¾	.09¼	.09¾
bgs, delv lb.	.09	.09½	.09	.09½	.09	.09½
Sulfocarbolate, 100 lb kgs lb.	.24	.26	.24	.26	.24	.26
Zirconium Oxide, crude, 73-75% grd, bbls, wks ton	75.00	100.00	75.00	100.00	...	...
kgs, wks lb.	.04¼	.04½	.04¼	.04½	...	...

Oils and Fats

Babassu, tks, futures lb.	...	.06½	.06½	.06¾	.06¾	.11¼
Castor, No. 3, 400 lb bbls lb.	.09¼	.10	.09¼	.10¾	.10¼	.10¾
Blown, 400 lb bbls lb.	.11¼	.12	.11¼	.13	.12¼	.13
China Wood, drs, spot NY lb.	.12½	.12¾	.12	.15¼	.12½	.23
Tks, spot NY lb.	.116	.118	.11½	.15½	.118	.23
Coast, tks lb.	...	nom.	...	...	.133	.23
Coconut, edible, bbls NY lb.	...	.09¼	.09¼	.09½	.09½	.15
Manila, tks, NY lb.	...	.03⅜	.03⅜	.04¼	.04	.09½
Tks, Pacific Coast lb.	...	.03⅛	.03⅛	.03¾	.03¾	.08⅞
Cod, Newfoundland, 50 gal bbls gal.	.50	nom.	.50	.52	.51	.52
Copra, bgs, NY lb.	...	.019	.019	.0235	.0235	.055
Corn, crude, tks, mills lb.	.07	.07⅛	.06⅝	.07¾	.06½	.10¾
Refd, 375 lb bbls, NY lb.	.09½	.09¾	.09¼	.10¼	.09	.13¼
Degras, American, 50 gal bbls, NY lb.	.07¾	.08¼	.07½	.08¼	.07½	.08¼
English, bbls, NY lb.	.07¾	.08¼	.07½	.08¼	.07½	.08¼
Greases, Yellow lb.	.03⅞	.04⅛	.03⅞	.05½	.04¼	.09
White, choice bbls, NY lb.	...	.05⅜	.05⅜	.07	.06¾	.10¼
Lard Oil, edible, prime lb.	...	.11⅛	.11⅛	.12¾	.12¾	.16¾
Extra, bbls lb.	...	.09⅛	.09⅛	.10¾	.10¾	.13½
Extra, No. 1, bbls lb.	...	.08⅞	.08⅞	.09¾	.09¼	.13½
Linseed, Raw less than 5 bbl lots lb.	.101	.103	.101	.115	.107	.121
bbls, c-l, spot lb.	.093	.095	.093	.102	.099	.113
Tks lb.	.087	.089	.087	.096	.093	.107
Menhaden, tks, Baltimore gal.	.35	nom.	.34½	.37½	.34	.45
Refined, alkali, drs lb.	.087	.089	.08	.095	.08	.10
Tks lb.	...	.081	.074	.087	.074	.09
Kettle bodied, drs lb.	.097	.099	.09	.105	.09	.11
Light pressed, drs lb.	.081	.083	.074	.091	.074	.094
Tks lb.	...	.074	.067	.08	.067	.084
Neatsfoot, CT, 20°, bbls, NY lb.	...	.16¼	.16¼	.17¼	.16¾	.18¼
Extra, bbls, NY lb.	...	.09⅛	.09⅛	.10	.09½	.13¾
Pure, bbls, NY lb.	...	.11¾	.11¾	.12¼	.11¾	.14¼
Oiticica, bbls lb.	.10½	.11	.10½	.12¾	.10⅞	.17
Oleo, No. 1, bbls, NY lb.	...	.08½	.08½	.10½	.10½	.14½
No. 2, bbls, NY lb.	...	.08	.08	.10	.10	.14
Olive, denat, bbls, NY gal.	.90	.95	.90	1.20	1.15	1.65
Edible, bbls, NY gal.	1.85	2.00	1.85	2.35	2.20	2.50
Foots, bbls, NY lb.	.08¼	.08¾	.08¼	.09⅞	.09⅝	.12½
Palm, Kernel, bulk lb.	...	.04⅛	.04⅛	.04½	.04½	.08⅛
Niger, cks lb.	.032	.036	.032	.04½	.04	.07¼
Sumatra, tks lb.	...	.03	.03	.0375	.0375	.06½
Peanut, crude, bbls, NY lb.	.07⅛	.07¼	.07	.07½	.06¼	.10⅝
Tks, f.o.b. mill lb.	...	.07	.06⅝	.07½	.06½	.10¼
Refined, bbls, NY lb.	.10	.10¼	.10	.10¼	.10	.13½
Perilla, drs, NY lb.	.10½	.10¾	.10½	.11¾	.11	.13½
Tks, Coast lb.	.098	.10	.098	.11	.105	.13
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY lb.	.14½	.14¾	.14½	.14¾	.13	.14¾
Denatured, drs, NY gal.	.86	.87	.86	.91	.85	.97
Red, Distilled, bbls lb.	.09⅝	.10⅝	.09⅝	.10⅝	.09⅝	.12⅝
Tks lb.	.08¾	.09¼	.08¾	.09¼	.08¾	.10¾
Sardine, Pac Coast, tks gal.	...	.38	.37	.46½	.35	.55
Refined alkali, drs lb.	.087	.089	.08	.095	.08	.10
Tks lb.	...	.089	.074	.087	.074	.09
Light pressed, drs lb.	.081	.083	.074	.089	.074	.094
Tks lb.	...	.074	.067	.08	.067	.084
Sesame, yellow, dom lb.	.10¼	.10½	.10¼	.10½	.10¼	.13¼
White, dom lb.	.10¼	.10½	.10¼	.10½	.10¼	.13¼
Soy Bean, crude Dom, tks, f.o.b. mills lb.	...	.06½	.06	.07	.06	.10½
Crude, drs, NY lb.	.073	.07½	.066	.08	.066	.11½
Ref'd, drs, NY lb.	.083	.092	.078	.097	.078	.12½
Tks lb.	...	.077	.072	.082	.072	.11½
Sperm, 38° CT, bleached, bbls NY lb.	.10	.102	.10	.102	.096	.102
45° CT, bleached, bbls, NY lb.	.093	.095	.093	.095	.089	.095
Stearic Acid, double pressed dist bgs lb.	.11	.12	.11	.12	.11	.13½
Double pressed saponified bgs lb.	.11¼	.12¼	.11¼	.12¼	.11¼	.13¾
Triple pressed dist bgs lb.	.14	.15	.14	.15	.14	.16½
Stearine, Oleo, bbls lb.	.06	.06¼	.06	.08	.07	.11½
Tallow City, extra loose lb.	...	.05⅛	.05⅛	.06⅜	.05⅞	.09¼
Edible, tierces lb.	...	.06¼	.06¼	.07¼	.06⅞	.10¼
Acidless, tks, NY lb.	...	.08½	.08½	.09¼	.09	.13
Turkey Red, single, bbls lb.	.08	.08½	.08	.08½	.08	.08½
Double, bbls lb.	.12½	.13	.12½	.13	.12½	.13
Whale: Winter bleach, bbls, NY lb.	.098	.10	.098	.10	.091	.111
Refined, net, bbls, NY lb.	.094	.096	.094	.096	.087	.107

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"We"—Editorially Speaking

The W. C. T. U. is posting all the motor highways with neat signs that read:

"Alcohol and Whisky =
Danger"

and the Chemurgic Council plans to call all the corn farmers out on a sit-down strike, staged (we presume) in all the nice cozy bar rooms.

❖❖❖❖

"We" apologize to our sensitive readers who feel that we should have been barred from the mails for Dr. Landis' African views (in the personal, not continental sense of that adjective). But you know what Carl Hazard said about chemical advertising.

❖❖❖❖

Perth Amboy of New Jersey is wondering why it has lost two important chemical plants—it is just that they need look no further than their local tax rate for the answer.

❖❖❖❖

Read 'em and weep—ratio of total U. S. taxes to national income 1929, 12%; 1938, 24%: ratio of public expenditures to national income 1929, 14.5%; 1938, 32-33%.

These figures are from governmental official sources computed by the National Industrial Conference Board.

❖❖❖❖

Henry Ford didn't talk long at the Newspaper Banquet, but he sure said a mouthful—"We are all on the spot."

❖❖❖❖

We have an honest-to-goodness author in our midst—John Klempner of Warner Chemical has crashed the literary gate with a first novel that Brickell, Johnson, Beatrice Sherman and the other sophisticated book reviewers hail with acclaim. It is titled "No Stork at Nine," and it's well worth reading.

❖❖❖❖

E. C. Harwood claims there are nine great current delusions:

1. That all economists are fools.
2. That gold has not been a good servant.
3. That devaluation will double prices.
4. That prices should behave.
5. That the competitive system has failed.
6. That all speculation is evil.
7. That we save too much.
8. That purchasing power creates prosperity.
9. That inflation can be closely controlled.

"We" opine that most of us cherish a couple of these delusions, and that if we all agreed on any two (pro or con), we could make or break the U. S.

❖❖❖❖

Our esteem for the esteemed *Christian Science Monitor* has sunk to a new low since reading the following in their issue of April 26:

"Feed 'Em Glass—The chief chemical engineer of the Tennessee Valley Authority, Dr. Harry F. Curtis, says that the TVA's Muscle Shoals plant is manufacturing 35 tons daily of a fertilizer containing a higher concentration of plant food than any other phosphate fertilizer, and the stuff is 16 per cent. cheaper. It is called calcium metaphosphate, and the mixture is composed of different kinds of powdered glass. No, it doesn't hasten the growth of glass flowers—but, confidentially, we're writing to ask how it may be applied to the raising of church windows."

❖❖❖❖

Believe it or not—"A man weighing 140 pounds contains enough fat for seven cakes of soap, carbon for 9,000 pencils, phosphorus to make 2,200 match heads, magnesium for one dose of salts, iron to make one medium-sized nail, sufficient lime to whitewash a chicken coop, enough sulfur to rid one dog of fleas, and water to fill a 10-gallon barrel."

So says Dr. F. E. Lawson, described by the *Readers Digest* as "English Savant."

❖❖❖❖

Here's the most thorough-going chemurgic idea to date: Allen Long of Brooklyn, Iowa, feeds soybean hay to his mules in a manger, and as the mules don't relish the beans, they serve as automatic threshing machines.

❖❖❖❖

Dr. Allan Harris of the University of British Columbia recently stressed, at Grand Forks, B. C., "the influence of science in everyday commercial activity" in an address, "Men, Money and Molecules"—so "We" learn from *Canadian Chemistry*, and "We" are that curious to know how much besides its alliterative title he borrowed from Williams Haynes' book.

❖❖❖❖

Said book has, by the way, just gone through its third printing in two years, and its publishers, Doubleday, Doran, announce total sales of over 16,000 copies.

❖❖❖❖

"We" have had seventeen compliments upon Haertel's article: "Hardwood as a Chemical Raw Material" (February issue) which we delight to pass on to an author who has conspicuously succeeded in the difficult task of making a well worn subject highly interesting.

❖❖❖❖

Our esteemed contemporary, *The Chemical Trade Journal* of London, finds in the first quarter's imports of chemical raw materials, no suggestion that the British chemical industry anticipates any drastic cut in production. Sulfur imports from the United States have fallen off sharply, but pyrites, chiefly Spanish origin, more than double. Bauxite imports advance from 16,991 to 24,731 tons. The carry-over from last year's heavy import of mercury has been reduced by over one thousand flasks, but the stocks are still substantial. There is very little complaint throughout the British chemical trade, and the market reports are filled with such phrases as "brisk demand" and "shortage of supply," which have a strangely unfamiliar ring amid all the political din that deafens us.

Fifteen Years Ago

From our issues of May, 1923

Thomas W. Delahanty appointed to staff of Chemical Division, Department of Commerce.

C. H. MacDowell, president, Armour Fertilizer Works, to receive Distinguished Service Medal, for service as head of the Chemical Branch, War Industries Board, during the war.

Dye importers meet to discuss formation of association.

F. J. Metzger elected president, Chemists' Club.

C. A. Mace, Butterworth-Judson, resigns to accept position with Tower Mfg. Co.

G. B. Heckel, Secretary, National Ass'n Paint and Varnish Mfrs., guest of honor at a testimonial dinner at the Manufacturers Club, Phila.

H. D. Ruhm, H. D. Ruhm & Co., elected president, Paint, Oil & Varnish Club, New York.

Edw. Mallinckrodt, St. Louis, donates $500,000 to Harvard for chemical laboratory.

A. V. H. Mory elected president, Chicago Chemists' Club.

CHNOLOGY DEPT.

VOL. 42
May '38

CHEMICAL INDUSTRIES

Statistical and Technical Data Section

NO. 5

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MAY 19 1938
DETROIT

State of Chemical Trade

Current Statistics (Apr. 30, 1938)—p. 9

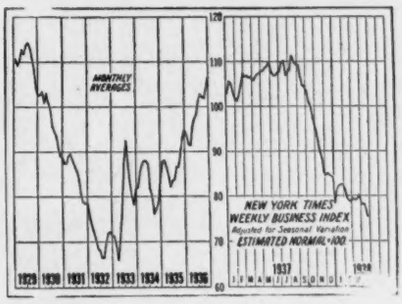
WEEKLY STATISTICS OF BUSINESS

Week Ending	Carloadings 1938	Carloadings 1937	Carloadings % of Change	Electrical Output* 1938	Electrical Output* 1937	Electrical Output* % of Change	Jour. of Com. Price Index	Nat'l Fertilizer Ass'n Price Indices: Chem. & Drugs	Fats & Oils	Fert. Mat.	Mixed Fert.	All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher's Index Pur. Power
Mar. 19	540,332	754,922	—28.4	2,017,653	2,211,052	— 8.7	78.4	95.0	64.5	72.1	77.8	76.0	78.4	33.7	79.2	121.5
Mar. 26	572,952	756,416	—24.3	1,975,239	2,200,143	—10.2	78.3	95.0	62.9	72.1	77.8	75.8	78.1	35.7	80.1	122.1
Apr. 2	523,489	721,229	—27.4	1,978,753	2,146,959	— 7.8	77.9	94.9	60.2	72.1	77.8	75.5	77.6	32.6	78.1	123.1
Apr. 9	521,978	711,079	—26.6	1,990,447	2,176,368	— 8.5	77.9	94.9	61.1	72.0	77.8	75.0	77.3	32.7	78.2	123.6
Apr. 16	537,585	746,523	—28.0	1,957,573	2,173,223	— 9.9	77.8	94.9	60.6	72.1	76.9	75.1	77.5	32.4	77.1	123.4
Apr. 23	523,767	756,248	—30.7	1,951,456	2,188,124	—10.8	77.6	94.9	60.8	72.1	76.9	74.7	77.3	32.0	75.4	123.4

* K.W.H., 000 omitted; † 1926-1928 = 100.0.

MONTHLY STATISTICS

CHEMICAL:	March 1938	March 1937	February 1938	February 1937	January 1938	January 1937
Acid, sulfuric **(expressed as 50° Baumé, short tons, Bureau of the Census)**						
Total prod. by fert. mfrs.	.....	193,979	159,659	178,979	183,794	176,492
Consumpt. in mfr. fert.	.....	196,134	125,294	164,880	147,443	164,320
Stocks end of month	.....	72,585	89,857	74,400	89,662	72,473
Alcohol, Industrial **(Bureau Internal Revenue)**						
Ethyl alcohol prod., proof gal.	18,305,610	19,873,456	16,708,492	17,571,664	15,847,102	18,704,895
Comp. denat. prod., wine gal.	130,577	260,002	153,361	486,698	168,465	667,706
Removed, wine gal.	121,517	226,422	151,155	424,528	178,156	639,069
Stocks end of mo., wine gal.	549,026	799,919	540,245	767,112	537,257	705,723
Spec. denat. prod., wine gal.	6,076,362	6,292,297	4,934,113	4,987,938	5,714,329	6,138,820
Removed, wine gal.	6,048,474	6,309,500	4,845,397	4,986,079	5,761,436	6,084,658
Stocks end of mo., wine gal.	663,519	479,888	638,597	501,387	555,318	502,866
Ammonia sulfate prod., tons *a*	36,134	71,592	32,959	63,861	37,246	69,698
Benzol prod., gals. *b*	5,998,000	10,737,000	5,575,000	9,522,000	6,155,000	10,369,000
Byproduct coke, prod., tons *a*	2,675,071	4,494,563	2,493,586	3,991,481	2,762,474	4,357,632
Cellulose Plastic Products **(Bureau of the Census)**						
Nitrocellulose sheets, prod., lbs.	.....	1,371,819	444,871	1,557,356	432,377	1,342,780
Sheets, ship., lbs.	.....	1,251,331	492,087	1,301,177	625,686	1,199,169
Rods, prod., lbs.	.....	334,841	185,607	347,783	165,498	281,539
Rods, ship., lbs.	.....	309,714	183,112	317,594	201,458	300,368
Tubes, prod., lbs.	.....	87,901	44,372	71,065	48,499	90,187
Tubes, ship., lbs.	.....	78,329	40,859	68,696	53,851	61,609
Cellulose acetate, sheets, rods, tubes:						
Production, lbs.	.....	1,621,103	337,938	1,269,775	344,539	853,376
Shipments, lbs.	.....	1,764,311	288,761	1,396,509	375,945	742,380
Methanol **(Bureau of the Census)**						
Production, crude, gals.	432,800	546,662	404,970	500,685	458,347	525,070
Production, synthetic, gals.	2,343,828	2,071,747	2,290,609	1,849,302	2,896,894	1,835,815
Pyrozylin-Coated Textiles **(Bureau of the Census)**						
Light goods, ship., linear yds.	.....	4,769,506	2,575,661	3,664,189	1,887,057	3,515,383
Heavy goods, ship., linear yds.	.....	2,642,703	1,511,615	2,142,082	1,392,924	2,102,800
Pyroxylin spreads, lbs. *c*	.....	7,803,471	4,258,768	6,498,204	3,602,058	5,964,572
Exports **(Bureau of Foreign & Dom. Commerce)**						
Chemicals and related prod. *d*	$11,560	$12,139	$8,784	$9,954	$9,720	$9,197
Crude sulfur *d*	$717	$499	$1,017	$373	$811	$730
Coal-tar chemicals *d*	$1,047	$1,366	$539	$1,078	$567	$1,065
Chemical specialties *d*	$2,307	$2,405	$1,894	$1,997	$1,891	$2,080
Industrial chemicals *d*	$2,136	$2,596	$1,810	$1,933	$2,071	$1,649
Imports						
Chemicals and related prod. *d*	$7,804	$10,775	$6,120	$9,739	$7,127	$8,564
Coal-tar chemicals *d*	$961	$1,438	$1,270	$1,369	$1,379	$1,335
Industrial chemicals *d*	$1,766	$2,833	$1,014	$2,265	$1,261	$2,243
Payrolls **(U. S. Dept. of Labor, 3 year av., 1923-25 = 100)**						
Chemicals and allied prod., including petroleum	119.5	128.1	119.4	123.6	117.4	119.4
Other than petroleum	114.5	128.8	113.7	123.9	112.2	119.4
Chemicals	118.0	140.2	123.1	135.2	124.8	131.8
Explosives	90.9	97.5	92.4	93.0	82.3	97.8
Employment **(U. S. Dept. of Labor, 3 year av., 1923-25 = 100)**						
Chemicals and allied prod., including petroleum	113.0	124.9	113.1	121.9	112.5	120.2
Other than petroleum	111.9	126.0	111.9	122.4	111.0	120.4
Chemicals	110.8	134.0	115.5	131.4	118.3	130.8
Explosives	87.2	90.2	87.4	93.2	90.2	94.0
Stocks of chemicals, etc.:**						
Finished	.....	154	189	153	173	143
Raw material	.....	78	110	84	118	93
Price index chemicals	.....	.....	83.6	95.6	84.1	96.4
Chem. and drugs	.....	.....	79.1	87.8	79.6	87.7
Fert. mat.	.....	.....	72.3	70.7	72.1	70.6
Mixed fert.	.....	.....	72.3	71.7	73.4	71.4



Business: Slight seasonal improvement reported in a few lines, but in most fields the month of April was a distinct disappointment. Business activity is still well below the corresponding period of '37.

Steel: April was a disappointment, producers running from 10% to 25% below March, depending upon the company and product. Current operations at 32%, as contrasted with over 90% in the same period of last year. Little improvement is now expected before July or even August.

Automobiles: Peak of '38 production is passing. Total for year is now estimated at 2,750,000. An exceptionally long summer shut-down is now almost a certainty. Revival of labor troubles adds additional confusion.

Textiles: Rayon production holds steady around 65%, although some plants are shut tight. Present outlook is that this rate will be maintained for the next 60 days. Silk and wool continue dull. Cotton production is being curtailed still further.

Paints, Varnish: Although some seasonal improvement was naturally reported, producers are very much disappointed at the volume this spring, particularly so because the weather was most favorable. Some in the trade feel, however, that the summer months may prove to be somewhat better than usual.

Retail Trade: Even with the aid of Easter business the volume was off from 4 to 12% below the corresponding month of last year. Where obvious bargains have been offered, retail outlets have been able to maintain sales levels, but the regular run of merchan-

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dise is moving at a most discouraging rate.

Rubber: The sorry showing in the automotive field naturally is reflected in sales of original equipment, but replacement sales are picking up. Activity in the Akron area is hampered by labor troubles. Stocks are still too large to see any production boom. An exceptionally dull summer is in prospect.

Leather: Most manufacturing centers report fair inquiries. A slight let-up in production is in evidence.

Wholesale Trade: Exceptionally dull.

Construction: March total was above February but under March a year ago. Outlook depends largely on how far the new pump-priming plans of President Roosevelt are placed in effect.

Unemployment: In comparison to the usual increase in employment of 200,000 to 300,000 workers in March an actual decline of 50,000 was reported. Administrator Harry Hopkins of the WPA states some 3,000,000 have lost jobs in the past 6 months.

National Income: Hopkins also estimates national income to have dropped from $68,000,000,000 to $56,000,000,000 during the last 6 months.

Outlook: Those who thought that a decided improvement would occur in the spring now appear to have guessed wrong. General consensus of opinion now is that the upturn will come in the fall, while in the meantime, business activity is expected to reach a still lower point in June. The political situation is still muddled. The declaration of the president for spending another 5 billion dollars for "pump-priming" is meeting with considerable resistance, and he may have difficulty in forcing his ideas through Congress if the country again protests as it did on the reorganization bill. On the other hand, such a sum is tempting with the important mid-term election but a few months away. More encouraging is the fact that inventories are, in many instances, dropping somewhat and by fall are expected to have reached the stage where reordering will take place. Business seems destined to round out at least 10 months of uninterrupted decline before any turn can be anticipated. The chemical field because of its diversification apparently is somewhat better off than most other groups. There are those, too, who hold that the chemical field in showing signs of improvement is really indicating that the turn has arrived.

MONTHLY STATISTICS (cont'd)

	March 1938	March 1937	February 1938	February 1937	January 1938	January 1937
FERTILIZER:						
Exports (short tons, Nat. Fert. Association)						
Fertilizer and fert. materials	.....	119,053	122,456	66,401	121,745	68,322
Ammonium sulfate	.....	581	78	304	4,706	474
Total phosphate rock	.....	82,854	104,251	42,348	78,785	50,272
Total potash fertilizers	.....	4,255	8,134	2,818	886	1,431
Imports (short tons, Nat. Fert. Association)						
Fertilizer and fert. materials	.....	291,451	159,506	261,193	189,174	223,230
Ammonium sulfate	.....	6,306	10,883	18,165	7,105	720
Sodium nitrate	.....	109,737	68,755	118,396	84,122	58,949
Total potash fertilizer	.....	61,816	22,534	37,351	48,083	125,360
Superphosphate [e] (Nat. Fert. Association)						
Production, bulk	257,595	371,164	251,999	317,015	299,484	320,164
Shipments, total	664,739	768,666	278,511	309,763	188,525	201,181
Northern area	235,742	224,558	98,542	85,329	68,747	58,476
Southern area	428,997	544,108	179,969	224,434	119,778	142,705
Stocks, end of month, total	.....	.....	2,030,579	1,798,950	2,013,189	1,735,979
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	1,592,939	1,872,296	759,813	806,002	468,340	438,326
Total, 12 southern	1,521,234	1,753,416	693,855	764,356	446,504	421,944
Total, 5 midwest	71,705	118,880	65,958	41,646	21,836	16,382
Fertilizer payrolls	108.5	127.6	86.8	86.9	78.5	77.8
Fertilizer employment	116.4	135.9	93.3	96.1	82.6	87.1
Value imports, fert. and mat. [d]	$4,261	$5,587	$3,206	$5,097	$3,736	$4,226
Value exports, fert. and mat. [d]	$1,670	$1,194	$1,087	$789	$1,353	$635
GENERAL:						
Acceptances outst'd'g [f]	$292	$396	$307	$401	$326	$387
Coal prod., anthracite, tons	3,467,048	4,235,094	3,056,728	3,042,496	4,421,519	3,673,605
Coal prod., bituminous, tons	.....	.....	27,000,000	42,110,000	30,880,000	40,940,000
Com. paper outst'd'g [f]	$296	$290	$293	$268	$299	.....
Failures, Dun & Bradstreet	1,088	820	1,071	721	1,320	811
Factory payrolls [i]	73.3	101.1	73.2	95.8	71.6	90.7
Factory employment [i]	81.7	101.1	82.2	99.0	82.2	96.5
Merchandise imports [i]	.....	.....	$163,085	$277,709	$170,763	$240,452
Merchandise exports [i]	.....	.....	$262,733	$233,125	$298,437	$222,665
GENERAL MANUFACTURING:						
Automotive production	221,951	494,121	186,806	364,193	210,120	379,843
Boot and shoe prod., pairs	.....	45,803,218	29,767,420	39,577,566	25,523,389	36,674,179
Bldg. contracts, Dodge [j]	$226,918	$231,246	$119,038	$118,945	$195,472	$242,844
Newsprint prod., U. S., tons	67,864	82,576	61,357	72,072	72,514	80,005
Newsprint prod., Canada, tons	224,604	301,110	202,601	275,532	222,500	287,691
Plate glass prod., sq. ft.	3,802,112	20,742,575	2,663,838	.....	5,119,182	6,373,282
Steel ingot prod., tons	2,011,840	5,216,243	1,703,245	4,413,832	1,732,266	4,724,894
% steel capacity	33.84	89.90	31.73	84.25	29.14	81.43
Pig iron prod., tons	1,452,487	3,459,473	1,298,268	2,992,218	1,429,085	3,211,500
U. S. consumpt. crude rub., tons	30,487	54,064	23,868	51,887	29,429	50,818
Cotton consumpt., bales	510,941	776,942	427,528	665,677	431,740	678,786
Cotton spindles oper.	22,288,098	24,640,046	22,356,638	24,517,706	22,327,444	24,364,802
Silk deliveries, bales	.....	.....	30,260	58,484	30,715	44,198
Rayon ship., index [p]	.....	.....	493	721	374	737
Rayon employment [i]	334.6	373.3	329.2	370.4	315.3	367.6
Rayon payrolls [i]	301.3	349.7	283.4	344.5	275.5	338.1
Soap employment [i]	95.8	111.0	96.3	109.8	94.0	100.3
Soap payrolls [i]	111.3	123.2	111.2	124.5	109.2	107.1
Paper and pulp employment [i]	108.1	117.6	108.7	116.1	108.2	113.7
Paper and pulp payrolls [i]	103.4	116.5	103.2	113.5	98.0	109.9
Leather employment	76.5	98.8	77.6	97.5	76.6	97.0
Leather payrolls [i]	78.3	107.3	80.2	104.6	76.9	102.5
Glass employment [i]	82.8	110.1	85.4	107.6	87.6	92.8
Glass payrolls [i]	79.8	115.1	79.1	107.2	76.2	84.6
Rubber prod. employment [i]	72.6	96.7	74.3	101.6	78.3	101.3
Rubber prod. payrolls [i]	60.6	99.8	58.9	104.4	65.9	99.4
Dyeing and fin. employment [i]	104.4	123.1	104.8	122.8	103.6	122.3
Dyeing and fin. payrolls [i]	88.4	112.6	89.5	111.9	83.9	112.2
MISCELLANEOUS:						
Oils and fats, price index	.....	130.2	89.7	129.3	88.4	136.5
Price index K, rosin	.....	152.7	90.8	164.1	101.7	169.8
Gasoline prod., bbls.	.....	.....	.....	.....	42,859,000	41,013,000
Cottonseed oil consumpt., bbls.	.....	.....	428,531	.....	369,149	.....
Price index, turpentine	.....	75.3	50.7	81.2	55.3	83.6
PAINT, VARNISH, LACQUER, FILLERS:						
Sales 680 establishments	.....	$39,498,071	$22,625,906	$31,015,653	$22,115,195	$31,288,615
Trade sales (580 establishments)	.....	$19,398,445	$12,535,636	$15,440,210	$11,448,115	$16,042,179
Industrial sales, total	.....	$16,601,194	$7,942,419	$12,885,413	$8,282,661	$12,456,616

[a] Bureau of Mines; [b] Crude and refined plus motor benzol, Bureau of Mines; [c] Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; [d] 000 omitted, Bureau of Foreign & Domestic Commerce; [e] Expressed in equivalent tons of 16% A.P.A.; [f] 000,000 omitted at end of the month; [i] U. S. Dept. of Labor, 3 year average, 1923-25 = 100; [j] 000 omitted, 37 states; [p] Rayon Organon, 1923-25 = 100; [q] 680 establishments, Bureau of the Census; [r] Classified sales, 580 establishments, Bureau of the Census; [s] 53 manufacturers, Bureau of the Census; [v] In thousands of bbls., Bureau of the Census; [**] Indices, Survey of Current Business, U. S. Dept. of Commerce.

Price Trend of Representative Chemical Company Stocks

	Mar. 31	Apr. 8	Apr. 15	Apr. 22	Apr. 29	Apr. 30	Net Gain or loss last mo.	Price on Apr. 30, 1937	1938 High	1938 Low
Air Reduction	40¼	43	44½	46	42¼	42	+ 1¾	74	58¼	40¼
Allied Chemical	125	135	141	141	137½	. .	+12½	231½	176½	124
Amer. Cyanamid	15¾	20	21	20⅜	17⅜	17¼	+ 1½	29	26⅜	15½
Amer. Agric. Chem.	50	55	55	55	...	...	....	87	66	49
Columbian Carbon	55	57	63¼	64¼	...	66¼*a*	+11¼	117	76	53¾
Commercial Solvents	6	7	7¼	7⅛	6¾	6¾	+ ¾	15⅜	10	5⅞
Dow Chemical	89*	92	96⅜	105	100⅛	100¼	+11¼	140	112	87⅞
Du Pont	94	96	102	102	97	96⅞	+ 2⅞	154	123⅜	90½
Hercules Powder	42¾	43⅜	43¼	44¾	43½	44	+ 1¼	155	58	42¼
Mathieson Alkali	19¾	22⅜	23¼	24¾	22¼	22⅛	+ 2⅜	37	27½	19¾
Monsanto Chemical	68½	73	73⅛	70¼	67½	...	— 1	85½	91½	67¼
Std. of N. J.	40¼	44⅛	46¼	48	45⅞	45⅝	+ 5⅛	...	54⅛	39¾
Texas Gulf Sulphur	26½	28⅝	29	30¾	29⅜	...	+ 2⅞	36¾	34	26
Union Carbide	58½	61	66½	67	63½	63	+ 4½	99	80	57
U. S. Ind. Alcohol	14	15½	15⅞	16½	...	16¼	+ 2¼	35	23¾	13½

* Mar. 30; *a* Apr. 26.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1938	Net income 1937	Common share earnings 1938	Common share earnings 1937	Surplus after dividends 1938	Surplus after dividends 1937
Air Reduction:							
Mar. 31 quarter	*y*$2.75	$795,590	$1,950,938	*h*$.31	*h*$.77	.....	.....
American Agric. Chem.:							
††Mar. 31 quarter	*y*8.00	294,743	503,727	*h*1.41	*h*2.39	*.....	*.....
9 months, Mar. 31	*y*8.00	427,390	665,421	*h*2.04	*h*3.15	*.....	*.....
American Cyanamid:							
Mar. 31 quarter	§.60	94,077	1,364,640	*c*.03	*c*.54	.....	.....
Atlas Powder:							
Mar. 31 quarter	*y*3.50	216,506	361,081	*h*.52	*h*1.10	.....	.....
12 months, Mar. 31	*y*3.50	1,289,295	1,436,026	*h*3.80	*h*4.28	.....	.....
Catalin Corp.:							
Mar. 31 quarter	....	*m*1.042	‡85,012	....	....	.....	.....
Climax Molybdenum:							
Mar. 31 quarter	*y*1.70	1,991,806	1,679,906	.79	.66	.....	.....
Commercial Solvents:							
Mar. 31 quarter	.60	†236,500	501,773	....	.19	.....	.....
Consolidated Chemical Industries:							
Mar. 31 quarter	....	101,858	360,186	*b*.15	*c*1.13	.....	.....
Du Pont:							
Mar. 31 quarter	*y*6.00	9,060,602	16,013,346	*j*.65	*j*1.34	$1,334,100	$6,080,011
Hercules Powder:							
Mar. 31 quarter	*x*1.15	656,027	1,475,590	*j*.40	*j*2.29	.....	.....
Freeport Sulphur:							
Mar. 31 quarter	2.00	427,940	543,287	.52	.66	.....	.....
Mathieson Alkali:							
Mar. 31 quarter	1.50	172,400	477,051	.16	.52	*.....	*.....
Monsanto Chemical:							
Mar. 31 quarter	§2.00	639,531	1,333,854	.52	1.20	.....	.....
Penick & Ford:							
Mar. 31 quarter	*y*1.25	368,890	90,460	1.00	.24	.....	.....
Pennsylvania Salt Mfg.:							
12 months, Mar. 31	*y*8.75	1,245,081	1,724,403	8.30	11.50	.....	.....
Procter & Gamble:							
Mar. 31 quarter	2.00	2,800,459	8,198,490	.40	1.26	.....	.....
9 months, Mar. 31	2.00	12,185,156	21,558,256	1.81	3.29	.....	.....
Union Carbide:							
Mar. 31 quarter	*y*3.20	4,209,333	9,947,712	*h*.47	*h*1.10	.....	.....
12 months, Mar. 31	*y*3.20	37,043,748	39,297,527	*h*4.11	*h*4.37	.....	.....
Victor Chemical Works:							
Mar. 31 quarter	*w*.20	156,247	183,874	.22	.26	.....	.....
Westvaco Chlorine:							
Mar. 31 quarter	1.00	173,837	221,874	.30	.44	*.....	*.....

y Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement; *h* On shares outstanding at close of respective periods; †† Indicated quarterly earnings as shown by comparison of company's reports for the 6 and 9 months period; § Plus extras; *c* On combined Class A and Class B shares; *m* Consolidated loss before federal income taxes; ‡ Profit before federal income taxes; † Net loss; *b* On Class B shares; *j* On average number of shares; * Not available; *x* Paid since stock split-up in November, 1937; *w* Last dividend declared, period not announced by company.

Dividends and Dates

Name	Div.	Stock Record	Payable
Am. Smelt. & Ref.	50c	May 6	May 31
Archer-Daniels-Midland, pf., q.	$1.75	Apr. 20	May 2
Atlas Powder, pf., q	$1.25	Apr. 20	May 2
Carman & Co., Class A, ac	50c	May 14	June 1
Colgate-Palmolive-Peet	action deferred Jan. 26, '38		
Dow Chemical	75c	May 2	May 16
Dow Chemical, pf., q	$1.25	May 2	May 16
du Pont, $4.50 pf.	$1.12½	Apr. 8	Apr. 25
du Pont, deb., q	$1.50	Apr. 8	Apr. 25
Glidden Co.	no action Mar. 7, '38		
Hercules Powder, pf., q	$1.50	May 5	May 14
Imperial Chem. Ind., F.	5½%	Apr. 21	June 8
Interchemical Corp.	action deferred Jan. 15, '38		
Interchemical Corp., pf., q	$1.50	Apr. 21	May 2
Int'l Nickel of Can., pf., q	$1.75	Apr. 2	May 2
Merck & Co.	no action Mar. 17, '38		
Monsanto Chem., pf. A, s	$2.25	May 10	June 1
Nat. Lead, pf. A, q	$1.75	May 27	June 15
Nat. Lead, pf. B, q	$1.50	Apr. 22	May 2
Procter & Gamble, q	50c	Apr. 25	May 14
Solvay Am. Corp., 5½%, pf., q	$1.37½	Apr. 15	May 16
United Dyewood	no action Feb. 15, '38		
United Dyewood, pf., q	$1.75	June 10	July 1
United Dyewood, pf., q	$1.75	Sept. 9	Oct. 1
United Dyewood, pf., q	$1.75	Dec. 9	Jan. 1, '39
Westvaco Chlorine, pf.	37½c	Apr. 11	May 2

ac, on accumulations.
q, quarterly.
s, semi-annual.

Standard (N. J.) Cuts Extra Dividend

Directors of Standard Oil Co. of New Jersey declared in April an extra dividend of 50 cents and the regular semi-annual dividend of 50 cents, both payable June 15 to stock of record May 16. In each of the three preceding semi-annual periods, the company paid extras of 75 cents in addition to the regular 50-cent payments.

While earnings in the first few months of this year have shown a decline in line with general business conditions, the reduction probably has not been as great as for most other integrated oil companies, particularly those operating in the mid-continent area.

The decision of directors to reduce the extra dividend probably was motivated by the need for cash to rebuild refineries and to undertake the recently announced tanker construction program in collaboration with the Government.

Volume of gasoline sales is running ahead of '37 but prices are somewhat lower, on the whole, while fuel oil demand has been reduced in line with lessened business activity, with a consequent lowering of prices.

Celanese Earns $114,274

Report of Celanese Corp. of America and subsidiaries for quarter ended Mar. 31, '38, subject to audit and year-end adjustments, shows net profit of $114,274 after interest, depreciation, federal income taxes, etc., equal to 69 cents a share on 164,818 shares of 7% cumulative prior preferred stock.

In March quarter of '37, net profit was $1,748,828, equal after 7% cumulative prior preferred dividends and under the participating provisions of the shares to $2.56 a share on 148,179 shares of 7% first participating preferred stock and $1.08 a share on 1,000,000 shares of common stock.

For 12 months ended Mar. 31, '38, net profit was $2,826,648 after federal income taxes and charges but before surtax on undistributed profits, equal after dividend requirements on 164,818 shares of 7% cumulative prior preferred stock, and under the participating provisions of the shares to $7.43 a share on 148,179 shares of 7% cumulative first participating preferred stock and 57 cents a share on 1,000,000 no-par shares of common stock.

Chemical Stock Values

The market value of all stocks on the N. Y. Stock Exchange increased $4,006,305,904 during April, and the average price of each issue rose $2.83. The value of the chemical group on May 1 totaled $4,360,284,479, as against $3,975,805,989 on April 1, a gain of $384,478,490. The average value for the chemical group was $48.89 on May 1 and $44.93 on April 1, a gain of $3.96.

Chemical Finances
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Chemical Stocks and Bonds

Apr. Last	1938 High	1938 Low	1937 High	1937 Low	1936 High	1936 Low	Sales (Number of shares) Apr. 1938	Sales (Number of shares) 1938	Stocks	Par $	Shares Listed	Dividends*	Earnings** $-per share-$ 1937	1936	1935
NEW YORK STOCK EXCHANGE															
41	45	36¼	55	36	...	...	1,800	5,600	Abbott Labs.	No	640,000	$2.10	2.51	2.21	1.77
42	58¼	40¼	80¼	44½	86½	58	44,700	120,600	Air Reduction	No	2,566,191	3.00	2.86	2.79	2.05
137½	176½	124	258½	145	345	157	30,700	69,900	Allied Chem. & Dye	No	2,214,099	7.50	11.19	11.44	8.71
56	66	49	101½	53½	89	49	2,200	6,700	Amer. Agric. Chem.	No	210,932	7.75	8.86	4.71	6.37
9⅞	13¾	9	30¾	8¼	35⅜	20½	9,000	28,700	Amer. Com. Alcohol	20	260,930	.50	3.23	4.55	3.16
24½	30¼	20	46	22	50	37	2,900	6,900	Archer-Dan.-Midland	No	549,546	2.00	5.03	3.05	4.20
40	48	36	94	38	84	48	2,300	9,200	Atlas Powder Co.	No	248,145	2.25	4.40	4.21	2.81
112	119	105	133	101	131	112	240	880	5% conv. cum. pfd.	100	68,597	5.00	20.90	20.85	16.93
13¾	18⅞	9	41¼	13	32¼	21¾	48,700	125,600	Celanese Corp. Amer.	No	1,000,000	2.25	2.04	2.33	1.99
94	94	92	115	90	116	106	.....	200	prior pfd.	100	164,818	7.00	27.07	27.25	35.34
8	11⅞	7⅜	25¾	8½	21¼	13	28,900	118,900	Colgate-Palm.-Peet	No	1,999,970	.50	—.35	1.40	1.36
81	95½	80	104½	95	106½	100	500	5,400	6% pfd.	100	248,197	6.00	3.21	17.13	16.79
65	76	53¾	125¾	65	136½	94	5,300	21,200	Columbian Carbon	No	537,406	6.50	8.31	7.48	5.56
6¾	10	5⅞	21¼	5	24⅝	14¼	51,200	170,500	Commercial Solvents	No	2,636,878	.60	.60	.85	1.02
61	65½	53	71¼	50½	82½	63⅜	22,600	67,400	Corn Products	25	2,530,000	3.00	2.52	3.86	2.62
165	166¼	162	171½	153	170	158	600	1,900	7% cum. pfd.	100	245,738	7.00	32.96	46.76	33.97
29½	39¼	25	76⅛	29½	63	42	2,350	5,710	Devoe & Rayn. A	No	95,000	3.25	4.05	4.49	2.89
100¼	112	87⅞	159¼	79½	142¼	94⅜	5,800	26,400	Dow Chemical	No	945,000	3.35	4.17	4.48	3.29
96⅞	123⅜	90½	180⅛	98	184¾	133	112,700	289,700	DuPont de Nemours	20	11,041,437	6.25	7.37	7.54	5.04
113¾	115¼	109½	112	107½	...	...	2,900	10,500	4½% pfd.	No	500,000	4.50	165.48	.....	.....
132¾	137	130¾	135½	130	136½	129	2,100	5,800	6% cum. deb.	100	1,092,948	6.00	81.70	84.21	56.81
147½	167	121½	198	144	185	156	25,300	57,100	Eastman Kodak	No	2,250,921	7.50	9.76	8.23	6.90
171	171	157	164	150	166	152	120	850	6% cum.	100	61,657	6.00	362.45	306.64	258.09
25⅛	28	19⅞	32¼	18	35⅝	23½	24,500	82,300	Freeport Texas	10	796,380	1.50	3.30	2.43	1.78
7¾	9⅞	6¾	19	8½	18	9½	4,500	31,700	Gen. Printing Ink	1	735,960	1.20	1.32	1.32	.97
18¼	27¼	13	51½	19⅛	55¼	39½	22,200	60,800	Glidden Co.	No	800,060	2.60	.....	3.29	2.74
39⅞	51½	37	58⅛	43	56	52¼	500	3,000	4½% cum. pfd.	50	199,940	2.25	.....	15.43	13.23
89½	95	79¾	117½	80⅛	133	99⅜	700	5,000	Hazel Atlas	25	434,474	6.56	6.67	6.55	7.58
44	58	42¾	92½	50	75	42	13,300	44,400	Hercules Powder	No	1,316,710	2.62	2.97	3.24	2.12
130	131½	126¾	135½	125	135	126	100	810	6% cum. pfd.	100	96,194	6.00	50.75	48.97	36.30
15¾	22	14⅜	47½	15	41⅜	25⅝	11,400	66,300	Industrial Rayon	No	759,325	2.00	.34	2.24	1.00
17¼	25	15	64¼	20	48	37	5,700	22,800	Interchem.	No	289,058	2.00	1.44	3.02	2.21
98	98	83	111½	92	112	107	300	990	6% pfd.	100	66,917	6.00	12.26	18.97	16.15
2⅜	3⅞	2	9⅛	2	5⅞	2⅞	7,600	46,700	Intern. Agricul.	No	438,048	....	.16	—1.55	—.99
21	29	15	63½	18¼	47¼	22¾	3,600	11,900	7% cum. pr. pfd.	100	100,000	3.00	7.70	.23	2.69
44⅝	52¾	36⅞	73⅛	37	66⅜	43¼	230,300	920,400	Intern. Nickel	No	14,584,025	2.25	3.31	2.40	1.65
23½	24	19½	28¾	19½	30	23	2,200	5,600	Intern. Salt	No	240,000	1.75	2.17	1.70	1.32
19⅞	24	19¾	36	19¼	36¾	29¼	500	2,400	Kellogg (Spencer)	No	500,000	1.60	2.81	2.62	2.22
27½	42	23¼	79	33⅝	80¼	47¼	38,300	100,200	Libbey Owens Ford	No	2,506,117	4.00	4.19	4.14	3.26
15¾	20	12⅝	26⅞	14	46½	32½	7,900	28,200	Liquid Carbonic	No	700,000	2.75	2.37	1.58	1.29
22⅛	27½	19¾	41¾	22	42⅜	27½	6,500	23,300	Mathieson Alkali	No	828,191	1.65	1.81	1.76	1.44
67½	91½	67¼	107½	71	103	79	27,300	62,500	Monsanto Chem.	No	1,114,388	3.00	4.40	4.01	3.45
114⅛	114⅛	111	109	105	...	...	100	400	4½% pfd.	No	50,000	4.50	99.98	.....	.....
20¾	29¾	17⅛	44	18	36½	26¾	55,600	161,000	National Lead	10	3,098,310	.50	.95	1.71	1.08
156	159	156	171	153	171	155	400	1,200	7% cum. "A" pfd.	100	243,676	7.00	22.86	33.83	25.40
133	136	130¾	150	127	147	137¼	300	940	6% cum. "B" pfd.	100	103,277	6.00	43.77	74.50	49.05
12½	19¼	9⅞	41¾	10⅛	40	9	64,500	309,800	Newport Industries	1	519,347	.50	2.22	.98	.57
49	66½	40	103¾	51¼	82	64	35,100	111,600	Owens-Illinois Glass	12.50	2,661,204	4.00	3.51	3.80	2.09
47	50⅝	39½	65½	43¼	56	40¼	23,600	72,000	Procter & Gamble	No	6,325,087	2.75	4.08	2.39	2.23
119	121	117	118½	114½	122½	115¾	1,060	3,690	5% pfd.	100	169,517	5.00	157.05	94.14	88.15
13¼	18¼	10	34¾	14⅞	28¼	14¾	30,000	81,000	Shell Union Oil	No	13,070,625	1.00	1.44	1.35	.37
99⅞	101¾	93	105⅜	91	127½	102	2,000	9,300	5½% cum. pfd.	100	379,798	5.00	60.59	57.20	17.92
22¾	34¾	18½	60⅝	26½	47⅜	19½	19,600	48,300	Skelly Oil	No	1,006,348	1.50	6.07	4.42	2.17
88	93	84	102¼	88	132	97⅝	500	2,000	6% cum. pfd.	100	66,300	6.00	97.86	73.16	39.00
29⅛	35½	24¾	50	26½	48½	32¾	57,200	177,700	S. O. Indiana	25	15,235,323	2.30	3.06	3.09	1.98
45⅝	54⅛	39¾	76	42	70⅜	51⅛	117,400	434,200	S. O. New Jersey	25	26,224,767	2.50	.....	3.73	2.39
6⅛	8	3⅞	15⅜	5¼	13	5⅝	21,100	55,500	Tenn. Corp.	5	853,696	.35	1.09	.41	.22
36¾	44⅞	32⅝	65⅛	34¾	55¼	28⅞	142,000	468,600	Texas Corp.	25	11,386,253	2.25	5.02	4.10	1.57
29⅜	34	26	44	23¾	44¾	33	18,000	65,400	Texas Gulf Sulphur	No	3,840,000	2.75	3.02	2.57	1.94
63	80	57	111	61¼	105¼	71⅝	123,300	326,300	Union Carbide & Carbon	No	9,000,743	3.20	4.75	4.09	3.06
40	49⅝	39	91	36¾	96¾	68	5,000	30,300	United Carbon	No	397,885	4.50	5.30	5.54	4.71
16¼	23¾	13½	43⅝	16⅛	59	31¼	13,200	48,600	U. S. Indus. Alcohol	No	391,238	..	1.24	—.20	2.16
15	20¾	11½	39⅜	9¼	30⅝	16¼	33,800	118,300	Vanadium Corp. Amer.	No	376,637	1.00	2.22	.40	—1.13
14½	14½	14	...	...	...	...	500	500	Victor Chem.	5	696,000	1.12	1.01	1.16	1.13
3⅜	5⅝	2¾	12¼	2⅜	8½	4⅜	15,100	90,600	Virginia-Caro. Chem.	No	486,708	....	—.05	—2.44	—.79
19	32⅛	15¾	74⅜	18½	58¾	28¾	12,500	60,600	6% cum. part. pfd.	100	213,392	1.50	5.88	.44	4.20
13½	27	20	27¼	10¾	32	19¾	2,700	9,900	Westvaco Chlorine	No	339,362	1.00	1.46	1.17	1.37
24½	27	20	34⅞	21⅛	35¼	31¾	4,900	9,600	cum. pfd.	30	192,000	1.50	4.09	3.26	3.22
NEW YORK CURB EXCHANGE															
17¼	26⅝	15½	37	17⅝	40¾	29¼	55,800	151,600	Amer. Cyanamid "B"	10	2,520,368	.60	2.09	1.77	1.61
65	82	59	124	69	116¼	99¼	375	1,125	Celanese, 7% cum. 1st pfd.	100	148,179	7.00	22.32	24.47	21.96
3	4½	3	15	3	16½	9	100	4,200	Celluloid Corp.	15	194,951	....	.....	—.80	—.95
12	12	12	14⅝	10½	15	11⅞	.....	100	Courtaulds' Ltd.	£1	24,000,000	9½%	8.64%	8.30%	7.51%
6¾	9⅞	6¾	10⅝	3½	10¾	5	1,400	8,900	Duval Texas Sulphur	No	500,000	....	.43	.61	.16
30¼	37½	27	47½	31	55	39	700	2,200	Heyden Chem. Corp.	100	150,000	2.50	3.94	3.56	3.22
71¾	90	55	147½	77	140	98¼	10,300	34,300	Pittsburgh Plate Glass	25	2,142,443	6.50	8.53	7.15	5.32
82¾	95	66	154¾	72¼	154½	117	8,050	25,200	Sherwin Williams	25	633,927	6.00	8.44	8.04	6.19
109¾	111½	107	114	106¼	116	110	250	650	5% cum. pfd.	100	137,139	5.00	44.01	41.44	33.17
PHILADELPHIA STOCK EXCHANGE															
124½	149½	122	179	115	179	114¼	475	1,775	Pennsylvania Salt	50	150,000	8.75	11.79	8.57	5.94

Apr. Last	1938 High	1938 Low	1937 High	1937 Low	1936 High	1936 Low	Sales Apr. 1938	Sales 1938	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
104	104⅞	99½	109½	99	117½	107¾	281,000	956,000	Amer. I. G. Chem. Conv.	1949	5½	M-N	$25,300,000
26⅛	31	25⅛	42½	23	42½	27½	88,000	909,000	Anglo Chilean Nitrate inc. deb.	1967	4½-5	J	12,067,000
104	105	102⅜	102⅞	100⅛	...	...	24,000	170,000	Dow Chemical	1951	3	J-D	5,000,000
100¼	100¾	100	102	98½	102¾	96¾	18,000	101,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M-N	5,633,000
26¼	32⅜	24¾	35⅜	21¼	39	21	185,000	709,000	Lautaro Nitrate n inc. deb.	1975	4	J-D	30,500,000
23	23	20½	25½	20½	35	23½	6,000	21,000	Ruhr Chem.	1948	6	A-D	1,500,000
101⅝	101⅞	96½	102	93	101¼	94¼	617,000	2,057,000	Shell Union Oil	1951	3½	M-S	58,800,000
98⅛	99½	90¼	102¾	94	102⅞	96⅝	172,000	592,000	Skelly Oil	1951	4	J-J	9,000,000
97	100	95	105	93½	105	103	19,000	84,000	Tenn. Corp. deb. "B"	1944	6	M-S	1,600,000
106	106⅜	103½	105¾	100	106	101½	561,000	1,573,000	Texas Corp.	1951	3½	J-D	60,000,000
80¾	88	77	111	81	98½	85¾	48,000	195,000	Vanadium Corp. conv.	1941	5	A-O	2,800,000

* Paid in 1937, including extras but excluding dividends paid in stock. ** For either fiscal or calendar years.

EXPORTS

	Twelve Months Ending Dec. 1937		Twelve Months Ending Dec. 1936	
	Quantity	Dollars	Quantity	Dollars
GROUP 8.				
COAL-TAR PRODUCTS	.....	14,877,555	.....	13,755,694
Crude and refined coal tar...gal.	7,149,851	453,195	11,041,626	559,792
Benzol .....gal.	20,480,711	2,824,037	19,177,898	2,918,058
Coal-tar pitch .....ton	22,763	284,234	85,062	715,602
Creosote or dead oil .....gal.	664,976	111,901	257,186	54,385
Other crude coal-tar products, n. e. s. .....lb.	24,325,164	1,242,076	29,638,544	871,449
Coal-tar intermediates .....lb.	10,978,513	1,568,781	2,939,390	539,098
Rubber-compounding agents of coal-tar products .....lb.	2,444,938	921,457	1,643,027	620,193
Coal-tar colors, dyes, stains, and color lakes .....lb.	16,689,061	6,244,189	17,407,625	6,080,735
Other finished coal-tar products .....lb.	6,736,566	1,227,685	10,527,933	1,416,382
MEDICINAL AND PHARMACEUTICAL PREPARATIONS	.....	17,979,326	.....	14,393,487
Castor oil .....gal.	79,196	88,217	81,765	89,575
White mineral oil .....gal.	2,488,227	770,019	1,427,439	495,903
CHEMICAL SPECIALTIES	.....	27,526,006	.....	20,455,595
Nicotine sulfate (40% basis) ..lb.	517,439	317,317	541,023	272,440
Copper sulfate (blue vitriol)..lb.	23,528,240	1,212,430	10,334,408	342,847
Lead arsenate .....lb.	1,042,880	91,377	827,560	64,215
Calcium arsenate .....lb.	5,384,560	242,818	6,294,563	274,315
Petroleum oil sprays .....gal.	263,761	90,086	5,925	2,919
Other agricultural insecticides, fungicides, and similar preparations and materials .....lb.	7,512,370	857,539	8,352,137	760,000
Household and industrial insecticides and exterminators:				
Liquid .....lb.	4,283,843	1,224,145	4,262,523	1,121,790
Paste, powder, or solid form lb.	560,843	139,405	513,304	118,050
Household and industrial disinfectants, deodorants, germicides, repellents, and similar preparations .....lb.	2,384,646	261,319	2,385,349	254,431
Baking powder .....lb.	2,613,955	462,370	2,250,733	405,824
Petroleum jelly .....lb.	39,361,424	1,730,655	22,176,991	1,085,126
Tobacco extracts .....lb.	1,581,695	255,982	1,590,821	257,036
Dextrine or British gum .....lb.	4,989,015	255,814	4,947,195	228,607
Textile specialty compounds ..lb.	3,756,732	388,021	3,529,031	346,449
Tanning specialty compounds..lb.	3,784,853	253,760	1,785,893	134,560
Water softeners, purifiers, boiler and feed-water compounds..lb.	3,220,371	377,796	2,709,730	318,968
Metal-working compounds ...lb.	3,003,243	331,971	2,082,437	215,084
Synthetic gums and resins (powder, flake, or liquid)...lb.	6,906,431	1,374,552	4,301,026	738,270
Pyroxylin products, known as Celluloid, pyralin, viscoloid, fiberloid, etc.:				
Pyroxylin scrap and film scrap .....lb.	3,423,181	282,099	1,488,212	168,480
Pyroxylin plastic film support (Celluloid film base) lb.	3,689,468	3,264,565	3,171,152	2,796,935
Pyroxylin sheets, rods, or tubes .....lb.	613,004	457,929	616,147	427,547
Cellulose acetate sheets, rods, or tubes .....lb.	944,004	718,974	652,370	482,308
Nitro and aceto cellulose:				
Solutions, collodion, etc. ....lb.	1,129,910	258,761	1,175,493	246,093
Not in solution .....lb.	3,178,696	571,065	2,815,766	533,290
Can cements .....lb.	660,789	174,258	559,126	120,512
Other cementing preparations for repairing, sealing, and adhesive use .....lb.	4,743,591	547,688	3,153,720	369,896
Specialty cleaning and washing compounds .....lb.	2,944,388	318,030	2,809,664	344,710
Polishes:				
Metal and stove polishes ...lb.	904,601	127,653	930,070	136,614
Shoe polishes and shoe cleaners .....lb.	2,016,167	415,692	1,601,076	354,572
Leather dressings and stains .lb.	2,116,487	351,296	1,961,056	315,541
Floor wax, wood and furniture polishes .....lb.	1,061,669	194,855	912,579	162,811
Automobile polishes .....lb.	1,192,549	235,729	1,115,839	225,921
Flavoring extracts .....gal.	48,678	344,731	43,363	281,910
Animal charcoal or bone char, deodorizing, decolorizing, and gas-absorbing carbons .....lb.	2,613,446	127,667	.....*	.....*
Rubber compounding agents, n. e. s. .....lb.	716,673	179,278	.....*	.....*
Other chemical specialty compounds, n. e. s.	.....	9,088,379	.....	6,530,555
INDUSTRIAL CHEMICALS	.....	27,504,817	.....	22,045,897
Acids and anhydrides:				
Acetic acid .....lb.	149,534	16,734	1,521,223	81,572
Acetic anhydride .....lb.	75,724	8,894	65,006	7,631
Other organic acids and anhydrides .....lb.	1,658,742	279,511	1,987,887	329,637
Inorganic:				
Hydrochloric (muriatic) ...lb.	7,628,746	123,455	6,093,518	98,197
Boric (boracic) .....lb.	15,843,776	735,208	9,257,190	497,554
Other inorganic acids and anhydrides .....lb.	16,730,711	552,494	13,072,630	431,596
Alcohols:				
Methanol .....gal.	839,156	313,786	668,059	283,494
Butanol (butyl alcohol) ....lb.	3,346,442	288,312	3,124,012	297,905
Glycerin .....lb.	1,375,036	338,148	1,146,026	182,592
Other alcohols .....lb.	12,140,296	1,433,306	8,572,891	976,784

* Not available for 1936.

EXPORTS

	Twelve Months Ending Dec. 1937		Twelve Months Ending Dec. 1936	
	Quantity	Dollars	Quantity	Dollars
INDUSTRIAL CHEMICALS—Cont'd				
Acetone .....lb.	9,653,659	626,113	5,636,385	455,782
Butyl acetate .....lb.	3,940,577	399,043	4,072,242	273,720
Carbon bisulfide .....lb.	5,881,538	260,773	4,997,841	226,448
Formaldehyde (formalin) .....lb.	2,864,872	118,963	1,844,258	88,854
Amyl acetate .....lb.	378,750	45,013	.....*	.....*
Synthetic collecting reagents for concentration of ores, metals, or minerals .....lb.	6,989,692	1,164,900	.....*	.....*
Other organic chemicals .....lb.	16,515,987	2,110,292	15,235,565	2,249,099
Aluminum sulfate .....lb.	63,614,536	679,214	57,575,835	598,001
Other aluminum compounds ..lb.	5,217,408	426,363	2,966,404	250,262
Calcium carbide .....lb.	4,830,695	156,912	4,164,115	148,225
Calcium chloride .....lb.	43,462,552	415,309	55,661,694	503,966
Hydrogen peroxide (or dioxide) lb.	188,314	27,617	369,609	52,476
Potassium compounds (not fertilizers) .....lb.	4,188,965	484,450	4,665,045	487,347
Sodium compounds .....lb.	703,196,151	12,010,629	512,140,617	9,320,830
Bichromate and chromate ..lb.	6,320,763	401,644	6,552,931	397,382
Cyanide .....lb.	888,970	122,804	750,214	116,880
Borate (borax) .....lb.	307,544,226	4,708,691	204,042,309	3,119,850
Silicate (water glass) .....lb.	15,593,684	241,174	13,281,565	201,741
Soda ash .....lb.	109,469,176	1,252,980	88,535,011	1,074,788
Sal soda .....lb.	2,080,234	25,190	1,512,097	20,153
Bicarbonate (acid or baking soda) .....lb.	19,270,947	306,830	16,529,186	275,054
Hydroxide (caustic soda), dry weight .....lb.	204,534,657	3,640,717	153,912,403	3,082,064
Sodium phosphate (mono-, di-, tri-, meta-, or pyro) .....lb.	5,868,883	219,716	6,922,445	213,008
Other sodium compounds ...lb.	31,624,611	1,090,883	20,102,456	819,910
Tin compounds .....lb.	218,006	69,969	344,378	97,095
Gases, compressed, liquefied, and solidified:				
Ammonia, anhydrous .....lb.	2,195,110	251,108	1,740,186	254,892
Other gaseous refrigerants ..lb.	1,915,535	423,769	1,045,989	266,710
Chlorine .....lb.	8,589,231	347,329	7,581,689	244,494
Liquefied petroleum gases...lb.	9,120,189	159,037	25,931,363	301,612
Helium gas .....cu. ft.	4,268	668	.....*	.....*
Other gases, n. e. s. .....lb.	1,929,151	348,269	1,597,420	292,487
Other industrial chemicals	.....	2,889,229	26,080,167	2,365,717
PIGMENTS, PAINTS, AND VARNISHES	.....	21,543,854	.....	17,788,013
Mineral earth pigments (dry):				
Ocher, umber, sienna, and other forms of iron oxide for paints .....lb.	13,478,092	375,572	29,028,754	333,414
Other mineral-earth pigments (whiting, barytes, etc.) ...lb.	25,170,051	255,080	26,624,154	235,187
Chemical pigments (dry):				
Zinc oxide .....lb.	5,905,912	378,332	2,660,431	190,045
Lithopone .....lb.	5,342,412	231,622	5,075,752	229,942
Bone black and lampblack ..lb.	1,701,877	124,088	1,479,022	99,600
Carbon black or gas black..lb.	184,029,552	8,688,870	154,718,398	7,250,704
Red lead .....lb.	1,867,523	158,923	1,619,562	113,897
Litharge .....lb.	2,904,475	220,134	2,772,518	166,093
White lead:				
Dry .....lb.	1,409,129	111,587	2,076,823	131,193
In oil .....lb.	1,063,856	95,794	1,646,414	134,545
Titanium dioxide and titanium pigments .....lb.	2,911,120	239,560	.....*	.....*
Other chemical pigments....lb.	6,878,051	1,275,353	7,810,626	1,286,834
Bituminous paints, liquid and plastic	.....	331,417	.....	266,021
Paste and semi-paste paint colors in oil, putty, and paste wood filler .....lb.	2,743,757	407,120	2,229,218	339,281
Kalsomine or cold-water paints, dry .....lb.	8,652,547	458,796	7,831,711	405,824
Nitrocellulose (pyroxylin) lacquers:				
Pigmented .....gal.	762,916	1,636,113	582,994	1,302,225
Clear .....gal.	200,723	447,482	116,655	239,443
Thinners for nitrocellulose lacquers .....gal.	952,579	718,547	800,074	625,131
Ready-mixed paints, stains, and enamels .....gal.	2,693,415	4,735,499	2,152,901	3,847,130
Varnishes (oil or spirit, and liquid driers) .....gal.	485,797	653,965	448,354	591,504
FERTILIZERS AND FERTILIZER MATERIALS .....tons	1,520,950	16,954,367	1,648,809	17,750,489
Nitrogenous fertilizer materials:				
Ammonium sulfate .....tons	73,916	2,013,902	105,782	2,682,498
Other nitrogenous chemical materials .....tons	123,008	2,919,268	124,840	2,966,648
Nitrogenous organic waste material .....tons	18,105	470,036	14,337	276,264
Phosphatic fertilizer materials:				
Phosphate rock:				
High-grade hard rock ..tons	120,478	795,704	155,801	1,090,734
Land pebble .....tons	932,324	5,022,527	1,053,150	5,652,788
Superphosphate .....tons	78,949	841,062	68,368	687,586
Other phosphate materials..tons	55,665	466,850	3,489	165,385
Potassic fertilizer materials..tons	91,992	3,278,895	92,878	3,049,822
Nitrogenous phosphatic types tons	22,762	1,001,375	25,524	1,029,473
Prepared fertilizer mixtures..tons	3,751	144,748	4,640	149,291
Totals, Group 8—Chemicals and Related Products,		**1937**		**$102,571,308**
		1936		**116,902,337**

Imports

Exports, Imports, 1937, 1936, p. 2

IMPORTS

	Twelve Months Ending Dec. 1937		Twelve Months Ending Dec. 1936	
	Quantity	Dollars	Quantity	Dollars
GROUP 8.				
COAL-TAR PRODUCTS	.....	18,353,081	.....	15,212,009
Dead or creosote oil, free....gal.	58,189,527	6,806,498	41,383,695	4,566,138
All other crudes, free.....	.....	2,972,415	.....	2,072,276
Acids, dut .....lb.	560,203	506,682	538,384	498,211
Other intermediates, dut.....lb.	2,251,356	2,197,515	1,788,887	1,986,603
Colors, dyes, stains, color acids, and color bases, n. e. s., dut lb.	3,381,452	5,200,948	3,768,918	5,697,793
Coal-tar medicinals, dut.....lb.	36,618	198,320	32,566	117,401
Other finished products, dut..lb.	227,919	470,703	144,817	273,587
MEDICINAL AND PHARMACEUTICAL PREPARATIONS	.....	4,893,994	.....	4,890,232
Quinine sulfate, free.....oz.	1,340,328	676,626	1,564,828	764,884
Other quinine and alkaloids and salts from cinchona bark, free .....oz.	2,625,292	534,044	2,179,588	545,411
Other alkaloids, salts and derivatives, dut.....	.....	133,911	.....	24,642
Menthol, dut .....lb.	458,581	1,087,068	341,510	830,913
Santonin and salts, free.....lb.	2,012	36,738	1,489	34,733
INDUSTRIAL CHEMICALS	.....	26,447,023	.....	20,960,007
Acetylene, butylene, ethylene, and propylene derivatives, dut .....lb.	2,118,002	356,936	1,652,280	332,400
Acids and anhydrides:				
Acetic or pyroligneous, dut..lb.	31,632,680	1,695,938	28,278,000	1,518,204
Arsenious (white arsenic), free lb.	38,542,723	820,241	35,171,964	741,224
Formic, dut.....lb.	844,203	66,836	654,894	52,730
Oxalic, dut.....lb.	218,465	12,124	189,042	9,541
Sulfuric (oil of vitriol) free lb.	2,751,872	17,476	1,986,050	12,687
Tartaric, dut.....lb.	327,036	52,197	360,282	50,420
All other free .....lb.	1,027,213	26,796	927,977	24,330
All other dut .....lb.	2,335,700	420,096	1,559,979	727,636
Alcohols, including fusel oil, dut	.....	1,558	.....	5,688
Ammonium compounds, n. e. s.:				
Chloride (muriate), dut.....lb.	8,448,437	203,073	9,283,374	217,741
Nitrate, dut .....lb.	6,444,227	71,523	3,390,368	42,956
All other, dut .....lb.	713,172	93,026	746,960	83,995
Barium compounds, dut .....lb.	1,681,217	58,099	1,675,000	58,383
Calcium compounds, dut .....lb.	1,507,947	38,684	1,359,420	39,820
Cellulose products, n. e. s.:				
Acetate, dut .....lb.	10,532	37,323	14,631	41,110
All other:				
Sheets more than 3/1000 inch thick and other forms, dut .....lb.	73,885	66,979	100,384	101,646
Sheets, bands and strips more than 1 inch wide, not over 3/1000 inch thick, dut .....lb.	148,831	28,059	194,077	37,798
Camphor:				
Natural, crude, dut .....lb.	1,911,775	553,968	2,285,985	624,700
Natural, refined, dut .....lb.	1,016,188	466,399	1,048,889	470,484
Synthetic, dut .....lb.	1,828,000	642,627	1,967,399	637,381
Cobalt oxide, dut .....lb.	842,847	1,059,432	813,642	885,566
Copper sulfate (blue vitriol) dut ..... lb. / copper cont. lb.	83,011 / 7,276	1,455	4,410 / 1,323	842
Glycerine, crude, dut .....lb.	13,598,403	2,290,568	11,148,985	1,199,360
Glycerine, refined, dut .....lb.	7,378,147	1,780,003	3,447,487	594,036
Iodine, crude, free .....lb.	1,967,148	1,784,491	592,217	558,326
Lime chlorinated or bleaching powder, dut .....lb.	2,153,956	55,907	1,707,537	43,958
Magnesium compounds, dut ..lb.	13,616,808	208,131	11,170,733	173,105
Potassium compounds, n. e. s.:				
Carbonate, dut .....lb.	1,575,747	81,234	2,794,666	150,806
Chlorate and perchlorate, dut lb.	13,911,061	585,470	13,951,668	768,632
Cream of tartar, dut .....lb.	40	9	190,502	18,658
Cyanide, free .....lb.	86,778	34,460	100,384	40,803
Hydroxide (caustic), dut ...lb.	2,273,802	167,857	3,092,280	209,505
Argols, tartar, and wine lees, free .....lb.	23,820,285	1,699,328	16,805,648	910,620
All other, dut .....lb.	4,413,785	329,384	2,959,761	207,390
Sodium compounds, n. e. s.:				
Sulfate (salt cake), free ...tons	196,586	1,871,881	135,197	1,333,825
Sulfate anhydrous, dut ....tons	13,668	288,935	10,584	225,613
Chlorate, dut .....lb.	7,069,842	265,848	4,611,922	206,274
Cyanide, free .....lb.	35,292,058	3,761,716	27,179,321	2,900,859
Ferro-cyanide (yellow prussiate), dut .....lb.	1,283,329	82,441	2,300,956	165,786
Nitrite, dut .....lb.	1,470	470	1,210	391
Phosphates (except pyro-phosphate), dut .....lb.	12,451	745	7,364	850
All other free .....lb.	553,113	5,290	577,605	4,945
All other dut .....lb.	.....	608,884	.....	588,995
Radium salts, free .....grains	236	377,659	263	700,019
Other industrial chemicals free..	.....	917,180	.....	998,434
Other industrial chemicals dut..	.....	2,458,287	.....	2,241,535
PIGMENTS, PAINTS, AND VARNISHES	.....	2,178,750	.....	1,970,572
Mineral earth pigments:				
Iron oxide and hydroxide, dut .....lb.	16,674,271	489,339	15,675,139	415,488
Ochers and siennas, dut ....lb.	13,111,003	224,325	10,219,728	191,007
All other, dut	.....	519,322	.....	314,717
Chemical pigments:				
Lithopone and other zinc sulfides, dut .....lb.	11,201,710	302,417	9,561,705	273,571
Zinc oxide and leaded zinc oxide, dut .....lb.	1,550,646	97,686	1,579,751	92,112

IMPORTS

	Twelve Months Ending Dec. 1937		Twelve Months Ending Dec. 1936	
	Quantity	Dollars	Quantity	Dollars
PIGMENTS, PAINTS, AND VARNISHES—Cont'd				
All other, dut .....lb.	1,915,744	227,220	2,941,231	354,514
Paints, stains, and enamels	.....	290,317	.....	300,123
Varnishes, dut .....gal.	10,480	28,124	12,399	29,040
FERTILIZERS AND MATERIALS ...ton	2,046,124	46,704,029	1,519,694	33,393,827
Nitrogenous:				
Ammonium sulfate, free ..tons	82,853	1,917,133	153,273	3,268,681
Ammonium nitrate mixtures (not containing phosphoric acid or potash) free .....tons	66,420	1,782,891	55,491	1,448,919
Calcium cyanamide or lime nitrogen, free .....tons	123,417	3,040,864	112,863	2,622,274
Calcium nitrate, free .....tons	40,612	1,083,939	36,959	956,491
Guano, free .....tons	13,104	375,650	22,804	457,209
Dried blood, free .....tons	12,264	707,877	10,074	461,068
Sodium nitrate, free .....tons	628,792	11,648,870	472,335	9,160,499
Urea and calurea, free ....tons	2,410	270,665	3,232	305,131
Other nitrogenous, free ...tons	186,310	5,059,573	114,901	2,248,622
Phosphates:				
Bone, ash, dust and meal and animal carbon and precipitated bone, free ..tons	41,755	977,574	27,032	561,751
Other phosphates, free ....tons	72,044	1,107,525	22,253	369,751
Potash fertilizers:				
Chloride, crude, free .....tons	372,930	9,725,200	210,678	5,193,634
Kainite, free .....tons	116,094	1,139,136	52,940	528,546
Manure salts, free .....tons	40,097	591,804	34,869	475,049
Sulfate, free .....tons	104,192	3,316,091	65,344	2,089,581
Nitrate (saltpeter), free ..tons	67,931	2,020,798	58,876	1,701,234
Other potash-bearing substances, free .....tons	228	1,952	249	2,206
Fertilizer compounds, containing nitrogen, phosphoric acid, and potash, free .....tons	8,494	415,467	5,236	323,507
All other, free .....tons	66,177	1,521,020	60,285	1,219,674
SOAP AND TOILET PREPARATIONS....	.....	3,130,703	.....	2,810,989
Soap:				
Castile, dut .....lb.	1,265,519	164,687	1,680,568	183,198
Toilet, dut .....lb.	607,701	199,630	606,193	178,161
Other dut .....lb.	1,836,524	190,071	1,633,138	178,682

Miscellaneous

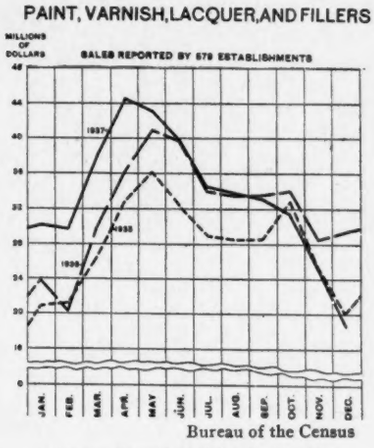
ANIMAL OILS, FATS AND GREASES, INEDIBLE	.....	7,814,564	.....	9,540,670
Whale oil, dut .....gal.	7,302,783	2,030,353	3,746,069	834,963
Cod oil, free .....gal.	2,954,156	1,188,824	2,799,694	1,005,675
Cod-liver oil, free .....gal.	5,915,964	3,866,971	5,789,574	3,546,733
Other fish oils, dut .....gal.	166,891	120,267	173,737	51,134
Wool grease, dut .....lb.	4,694,316	221,513	6,569,937	327,999
Tallow, dut .....lb.	3,850,831	205,528	68,936,476	3,558,113
Stearic acid, dut .....lb.	1,465,046	130,206	1,816,681	164,316
Oils, fats and greases, n. e. s. dut	.....	46,227	.....	51,521
Beeswax, bleached, etc., dut	.....	7,732	.....	3,292
Beeswax, crude and animal wax, n. e. s., free .....lb.	5,392,065	1,409,001	4,263,290	984,744
Tankage, free .....tons	47,190	2,006,205	48,163	1,715,419
Fish scrap and fish meal, free tons	68,204	2,514,478	43,722	1,389,641
Other inedible animal products..	.....	715,583	.....	595,827
GUMS, RESINS, AND BALSAMS, N. E. S.	.....	14,016,906	.....	9,471,548
Damar, free .....lb.	18,167,512	1,205,183	15,707,671	903,268
Kauri, free .....lb.	2,139,207	282,577	970,484	115,098
Lac, crude, seed, etc., free ...lb.	20,678,070	1,734,954	16,720,322	1,481,762
Shellac, unbleached, free .....lb.	20,326,467	2,176,732	14,877,586	1,723,213
Shellac, bleached, free .....lb.	433,779	70,371	320,659	57,384
Other varnish gums, free ....lb.	24,788,544	1,308,329	20,383,225	1,018,881
Tar, pitch, and turpentine, dut..	.....	168,394	.....	233,134
Chicle, crude, free .....lb.	10,660,006	3,009,441	6,749,591	1,604,848
Balsams, crude, dut .....lb.	469,915	157,330	335,356	114,875
Arabic or senegal, dut .....lb.	9,494,117	770,820	8,424,146	618,948
Tragacanth, free .....lb.	3,244,994	1,382,392	2,093,134	592,284
Kadaya (Karaya) and talka, free .....lb.	7,205,558	938,536	5,401,334	598,077
Other gums and resins	.....	811,847	.....	409,776
Pyrethrum or insect flowers, free .....lb.	20,091,596	2,204,451	11,756,979	943,271
Expressed oils and fats	.....	81,207,582	.....	62,842,233
Tung oil, free .....lb.	174,884,803	20,099,879	134,829,996	17,838,114
Coconut oil, dut .....lb.	50,777	3,556	15,359	1,153
From Philippine Islands, free .....lb.	337,324,919	19,885,779	322,050,056	12,225,642
Palm oil, free .....lb.	411,112,412	15,835,019	338,788,706	11,630,688
Inedible oils for mechanical or manufacturing purposes:				
Olive oil sulfured, free ....lb.	22,100,922	1,954,403	17,400,853	1,128,488
Other inedible olive oil, free lb.	4,869,808	770,412	12,005,461	1,191,421
Rapeseed oil, dut .....gal.	649,953	292,006	3,023,401	1,343,804
Sunflower oil, dut .....lb.	307,465	17,507	541,246	33,381
Palm-kernel oil, free .....lb.	127,818,793	8,395,914	12,522,741	591,392
Sesame oil, dut .....lb.	160	10	48,928	3,520
Vegetable tallow, free .....lb.	7,818,275	479,618	2,977,402	138,034
Totals, Group 8—Chemicals and Related Products,			**1937**	**$102,571,308**
			1936	**79,975,460**

Paints, Varnish, Lacquers, Shellac, Fillers, 1937

Sales, Exports, Employment data, Prices, etc.—p. 1

Paint, Varnish, Lacquer, Fillers Sales

Statistics on sales of paint, varnish, lacquer, and fillers for the months of 1937 and 1936 and the totals for 1935 are given in the table opposite. Table 1 shows, by months, for 579 establishments the total volume of sales reported, the volume reported by 344 establishments which have classified their sales into trade and industrial (paint and varnish, and lacquer), and the volume of unclassified sales reported by 235 establishments. Table 2 shows statistics on sales for 680 establishments for the months of 1937 and 1936. The table on page 2 shows for the years 1928 to 1937, a summary of total sales, by months, by 579 establishments. Data are compiled by the Bureau of the Census.



3-Year Record of Sales by Months

Best Year Since '29

The '37 sales volume for paint, varnish, lacquer, and fillers was the largest since the record year of '29. Total for the year was $402,126,113, as against $382,556,555 for 1936. Total sales for '35 amounted to $334,277,609 and for the peak year '29 totaled $420,514,471.

Sales of Lacquers by Quarters

Statistics on sales for clear lacquers, pigmented lacquers, lacquer bases and dopes, and thinners for the quarters of 1937, 1936, and 1935 are given on page 2. Table 1 shows the sales of 158 identical manufacturers for the quarters of 1937, 1936, and 1935. Table 2 presents the sales by 102 identical manufacturers for the quarters of 1937, 1936, and 1935.

Construction Sets 6-Year Mark

The amount of construction undertaken during 1937 reached a 6-year peak. Total contracts awarded in the 37 Eastern states attained highest dollar volume for any year since 1931. In residential building, the volume last year was the best since '30.

PAINT, VARNISH, LACQUER AND FILLERS*

Table 1. Sales by 579 Establishments

Year and Month	Total Sales Reported by 579 Establishments	Classified Sales Reported by 344 Establishments — Trade Sales of Paint, Varnish, and Lacquer	Industrial Sales — Total	Industrial Sales — Paint and Varnish	Industrial Sales — Lacquer	Unclassified Sales Reported by 235 Establishments
1937						
Jan.	$30,202,114	$11,645,957	$9,080,451	$6,502,757	$2,577,694	$9,475,706
Feb.	29,749,109	10,738,586	9,518,160	6,840,489	2,677,671	9,492,363
Mar.	37,866,484	13,988,634	12,213,555	8,746,861	3,466,694	11,664,295
Apr.	44,561,902	18,581,057	12,461,995	8,915,783	3,546,212	13,518,850
May	43,355,320	17,611,804	12,733,701	9,317,559	3,416,142	13,009,815
June	39,837,755	15,960,273	12,253,468	8,595,913	3,657,555	11,624,014
July	34,494,624	13,234,494	11,217,109	7,668,080	3,549,029	10,043,021
Aug.	33,784,877	13,242,578	10,431,468	7,072,652	3,358,816	10,110,831
Sept.	33,062,213	13,044,002	9,931,291	6,874,529	3,056,762	10,086,920
Oct.	31,486,019	11,732,934	10,493,711	6,733,681	3,760,030	9,259,374
Nov.	25,104,374	9,302,027	8,541,358	5,595,398	2,945,960	7,260,989
Dec.	18,621,322	6,756,539	6,566,790	4,571,971	1,994,819	5,297,993
Tot. (Year)	**402,126,113**	**155,838,885**	**125,443,057**	**87,435,673**	**38,007,384**	**120,844,171**
1936						
Jan.	23,803,627	8,166,997	8,188,213	5,528,374	2,659,839	7,448,417
Feb.	20,180,869	7,200,870	7,161,505	4,915,935	2,245,570	5,818,494
Mar.	29,912,407	11,445,595	9,282,250	6,355,625	2,926,625	9,184,562
Apr.	36,209,030	14,177,951	11,021,214	7,652,925	3,368,289	11,009,865
May	40,949,831	17,279,937	10,746,276	7,528,693	3,217,583	12,923,618
June	38,735,681	15,792,120	10,794,721	7,583,881	3,210,840	12,148,840
July	33,919,137	13,105,805	10,286,928	7,371,114	2,915,814	10,526,404
Aug.	33,380,037	13,243,072	9,095,490	6,699,313	2,396,177	11,041,475
Sept.	33,449,725	12,773,578	9,564,224	6,793,781	2,770,443	11,111,923
Oct.	34,048,582	12,563,930	10,627,878	7,465,159	3,162,719	10,856,774
Nov.	28,502,938	10,019,341	10,017,744	6,710,246	3,307,498	8,465,853
Dec.	29,464,691	9,536,052	10,223,290	6,792,320	3,430,970	9,705,349
Tot. (Year)	**382,556,555**	**145,305,248**	**117,009,733**	**81,397,366**	**35,612,367**	**120,241,574**
1935						
Jan. to Nov.	314,238,704	123,644,928	91,475,280	64,851,842	26,623,438	99,118,496
Dec.	20,038,905	6,710,391	7,560,671	5,247,518	2,313,153	5,767,843
Tot. (Year)	**334,277,609**	**130,355,319**	**99,035,951**	**70,099,360**	**28,936,591**	**104,886,339**

Table 2. Sales by 680 Establishments†

Year and Month	Total Sales Reported by 680 Establishments	Classified Sales Reported by 580 Establishments — Trade Sales of Paint, Varnish, and Lacquer	Industrial Sales — Total	Industrial Sales — Paint and Varnish	Industrial Sales — Lacquer	Unclassified Sales Reported by 100 Establishments
1937						
Jan.	$31,288,615	$16,047,179	$12,456,616	$8,906,595	$3,550,021	$2,784,820
Feb.	31,015,653	15,440,210	12,885,413	9,201,543	3,683,870	2,690,030
Mar.	39,498,071	19,398,445	16,601,194	12,036,210	4,564,984	3,498,432
Apr.	46,345,474	25,102,366	16,759,108	12,179,600	4,579,508	4,484,000
May	45,254,635	24,206,972	16,785,249	12,526,801	4,258,448	4,262,414
June	41,656,085	22,348,182	15,343,359	10,843,172	4,500,187	3,964,544
July	36,004,636	18,502,323	14,186,572	9,763,920	4,422,652	3,315,741
Aug.	35,305,043	18,521,006	13,517,878	9,230,886	4,286,992	3,266,159
Sept.	34,489,882	18,166,243	12,993,944	9,023,194	3,970,750	3,329,695
Oct.	32,791,845	16,256,222	13,447,493	8,761,135	4,686,358	3,088,130
Nov.	26,105,315	12,790,654	10,889,719	7,169,000	3,720,719	2,424,942
Dec.	19,348,567	9,088,658	8,293,742	5,653,369	2,640,373	1,966,167
Tot. (Year)	**419,103,821**	**215,868,460**	**164,160,287**	**115,295,425**	**48,864,862**	**39,075,074**
1936						
Jan. to Nov.	367,538,406	189,146,362	144,785,210	102,038,283	42,746,927	33,606,834
Dec.	30,494,364	13,926,890	13,435,807	8,994,419	4,441,388	3,131,667
Tot. (Year)	**398,032,770**	**203,073,252**	**158,221,017**	**111,032,702**	**47,188,315**	**36,738,501**

* Source: Dept. of Commerce, Bureau of the Census.
† Includes data for establishments shown in Table 1.

Contracts awarded in the 37 Eastern states for '37 amounted to $2,913,060,000, as reported by F. W. Dodge Corp. This total represents an increase of 9% over the '36 total of $2,675,296,000.

All classes of construction shared in

Paints, Varnish, Lacquers, Shellac, Fillers, 1937
Sales, Exports, Employment data, Prices, etc.—p. 1

Paints, Varnish, Lacquers, Shellac, Fillers, 1937

Sales, Exports, Employment data, Prices, etc.—p. 2

PAINT, VARNISH, LACQUER, AND FILLERS*

Summary of Total Sales by 579 Establishments, by Months, 1928-1937

Month	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928
Jan.	$30,202,114	$23,803,627	$20,835,518	$20,141,156	$11,199,240	$15,888,855	$20,310,784	$26,617,208	$30,824,446	$29,195,290
Feb.	29,749,109	20,180,869	21,229,132	17,287,724	11,565,136	16,262,576	20,894,853	28,364,474	30,846,424	30,750,617
Mar.	37,866,484	29,912,407	26,544,245	22,627,382	13,472,526	19,079,705	26,742,550	32,796,286	39,750,854	37,197,643
Apr.	44,561,902	36,209,030	32,851,225	27,116,692	18,914,864	22,601,920	31,851,281	38,459,583	43,042,015	38,157,393
May	43,355,320	40,949,831	36,160,067	32,991,160	26,029,578	24,972,762	33,383,847	37,006,677	46,200,757	45,201,906
June	39,837,755	38,735,681	32,325,512	28,154,013	27,602,184	19,624,641	28,571,399	36,476,680	41,362,280	41,672,728
July	34,494,624	33,919,137	28,975,289	22,942,907	21,878,744	14,376,301	22,589,377	29,243,951	38,006,714	33,422,736
Aug.	33,784,877	33,380,037	28,501,654	23,771,319	20,372,499	15,975,278	21,303,007	27,916,739	42,071,846	38,145,686
Sept.	33,062,213	33,449,725	28,536,075	21,714,509	18,903,549	16,751,179	21,925,486	28,149,101	36,484,869	34,890,361
Oct.	31,486,019	34,048,582	32,853,356	23,652,268	18,614,304	15,536,898	20,726,978	26,553,618	35,888,912	35,995,828
Nov.	25,104,374	28,502,938	25,426,631	19,801,013	15,937,120	12,424,213	16,479,234	19,895,890	28,148,862	29,871,495
Dec.	18,621,322	29,464.691	20,038,905	16,005,974	15,814,149	9,426,271	13,476,516	16,672,485	22,189,467	26,012,788
Total	402,126,113	382,556,555	324,277,609	276,206,117	220,303,893	202,920,599	278,255,312	348,152,692	434,817,446	420,514,471

* Source: Dept. of Commerce, Bureau of the Census.

TABLE 1. SALES OF LACQUER (158 IDENTICAL MANUFACTURERS) BY QUARTERS*

Year and Quarter	Total		Clear Lacquers		Pigmented Lacquers		Lacquer Bases and Dopes		Thinners	
	Gallons	Value	Gallons	Value	Gallons	Value	Gallons	Value	Gallons	Value
1937										
1st Quart.	11,404,989	$14,347,417	2,784,003	$3,779,869	3,040,828	$6,532,807	523,630	$610,805	5,056,528	$3,423,936
2nd Quart.	13,066,499	16,160,078	2,777,704	3,779,829	3,552,172	7,715,091	562,702	644,074	6,173,921	4,021,084
3rd Quart.	12,135,940	15,294,633	2,835,367	3,907,001	3,135,340	6,988,415	499,522	574,241	5,665,711	3,824,976
4th Quart.	10,209,685	12,688,064	2,259,966	3,070,026	2,695,660	6,062,869	367,064	422,974	4,886,995	3,132,195
Tot. (Year)	46,817,113	58,490,192	10,657,040	14,536,725	12,424,000	27,299,182	1,952,918	2,252,094	21,783,155	14,402,191
1936										
1st Quart.	9,559,648	12,219,101	2,030,322	2,785,309	2,716,369	5,901,911	440,756	497,866	4,372,201	3,034,015
2nd Quart.	12,071,087	15,138,829	2,332,028	3,143,694	3,724,208	7,699,026	454,419	515,055	5,560,432	3,781,054
3rd Quart.	10,535,520	13,398,161	2,768,783	3,745,912	2,654,737	5,726,851	503,578	574,710	4,608,422	3,350,688
4th Quart.	12,121,013	15,093,889	2,915,649	3,936,299	3,220,487	7,011,408	465,147	539,380	5,519,730	3,606,802
Tot. (Year)	44,287,268	55,849,980	10,046,782	13,611,214	12,315,801	26,339,196	1,863,900	2,127,011	20,060,785	13,772,559
1935										
1st Quart.	8,230,039	10,618,239	1,834,418	2,551,912	2,211,968	4,915,806	370,766	447,100	3,812,887	2,703,421
2nd Quart.	9,028,065	11,415,809	1,856,517	2,568,044	2,424,617	5,284,258	445,525	524,981	4,301,406	3,038,526
3rd Quart.	8,872,080	11,341,847	2,054,210	2,897,899	2,235,096	4,839,373	455,261	529,610	4,127,513	3,074,965
4th Quart.	10,367,227	13,149,749	2,215,208	3,086,376	2,942,893	6,297,901	521,685	581,366	4,687,441	3,184,106
Tot. (Year)	36,497,411	46,525,644	7,960,353	11,104,231	9,814,574	21,337,338	1,793,237	2,083,057	16,929,247	12,001,018

TABLE 2. SALES OF LACQUER (102 IDENTICAL MANUFACTURERS)

Year and Quarter	Total		Clear Lacquers		Pigmented Lacquers		Lacquer Bases and Dopes		Thinners	
	Gallons	Value	Gallons	Value	Gallons	Value	Gallons	Value	Gallons	Value
1937										
1st Quart.	10,006,491	$12,656,240	2,228,316	$3,167,905	2,766,286	$5,932,016	380,933	$470,700	4,630,956	$3,085,619
2nd Quart.	11,738,981	14,594,855	2,268,587	3,208,237	3,303,895	7,194,952	397,379	479,314	5,769,120	3,712,352
3rd Quart.	10,841,137	13,720,926	2,347,962	3,326,580	2,891,697	6,463,902	329,664	405,170	5,271,814	3,525,274
4th Quart.	9,094,998	11,388,970	1,793,884	2,552,002	2,507,755	5,648,557	256,046	316,380	4,537,313	2,872,031
Tot. (Year)	41,681,607	52,360,991	8,638,749	12,254,724	11,469,633	25,239,427	1,364,022	1,671,564	20,209,203	13,195,276
1936										
1st Quart.	8,554,349	10,984,630	1,662,446	2,374,102	2,511,121	5,446,144	312,468	370,962	4,068,314	2,793,422
2nd Quart.	10,855,635	13,673,224	1,871,669	2,652,859	3,485,172	7,161,084	309,114	366,602	5,189,680	3,492,679
3rd Quart.	9,288,093	11,923,618	2,291,980	3,206,229	2,443,356	5,271,763	330,382	397,302	4,222,375	3,048,324
4th Quart.	10,786,356	13,486,018	2,349,810	3,327,453	2,971,860	6,458,481	309,488	380,519	5,155,198	3,319,565
Tot. (Year)	39,484,433	50,067,490	8,175,905	11,560,643	11,411,509	24,337,472	1,261,452	1,515,385	18,635,567	12,653,990
1935										
1st Quart.	7,317,291	9,528,368	1,405,820	2,123,052	2,047,402	4,527,927	327,220	392,925	3,536,849	2,484,464
2nd Quart.	8,078,745	10,255,865	1,473,540	2,147,103	2,246,004	4,887,825	340,186	405,187	4,019,015	2,815,750
3rd Quart.	7,883,929	10,118,399	1,684,700	2,457,631	2,042,567	4,416,093	330,400	406,983	3,826,262	2,837,692
4th Quart.	9,258,638	11,794,766	1,791,134	2,606,365	2,739,437	5,832,257	330,864	396,916	4,397,203	2,959,228
Tot. (Year)	32,538,603	41,697,398	6,355,194	9,334,151	9,075,410	19,664,102	1,328,670	1,602,011	15,779,329	11,097,134

* Dept. of Commerce, Census of Manufacturing.

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the improved conditions during '37 with the exception of public works. Privately financed work continued the upward trend which started in 1935 by recording a percentage gain of 31 over '36. On the other hand, publicly financed construction declined 14% from '36.

Index of Prices, Paints and Paint Materials by Months for the Years 1930-1937*

(1926 = 100)

Month	1937	1936	1935	1934
January	83.7	79.6	79.0	78.4
February	83.4	79.5	78.8	79.3
March	83.9	79.2	79.4	79.7
April	83.9	79.3	79.2	79.8
May	83.7	78.8	79.9	80.3
June	83.6	79.5	79.8	80.3
July	83.9	80.4	79.1	79.8
August	84.1	81.0	78.6	79.9
September	84.6	80.6	80.8	79.5
October	84.2	80.2	81.9	79.4
November	81.5	80.5	80.3	78.8
December	...	82.4	80.0	78.8
Year	...	80.1	79.8	79.5

* Source: U. S. Dept. of Labor.

Purchasing Power of the Wholesale Price Dollar, Paints and Paint Materials*

(1926 = $1,000)

Month	1937	1936	1935	1934
January	$1.195	$1.256	$1.266	$1.276
February	1.199	1.258	1.269	**1.261**
March	1.192	1.263	1.259	1.255
April	1.192	1.261	1.263	1.253
May	1.195	1.269	1.252	**1.245**
June	1.196	1.258	1.253	1.245
July	1.192	1.244	1.264	1.253
August	1.189	1.235	1.272	**1.253**
September	1.182	1.241	1.238	1.258
October	1.188	1.247	1.221	1.259
November	1.227	1.242	1.245	**1.269**
December	....	1.214	1.250	1.269

* Source: U. S. Dept. of Labor.

Increase in Shellac Imports

Total imports of crude lac and unbleached and bleached shellac into the United States increased during 1937 as compared with the previous year. Separate import figures of these items for 1936 and 1937 are as follows:

U. S. Shellac Imports, 1936, 1937*

Item—1936	Quantity Lb.	Value
Crude lac	16,720,322	$1,481,762
Unbleached shellac	14,877,586	1,723,213
Bleached shellac	320,659	57,384
1937		
Crude lac	20,678,070	$1,734,954
Unbleached shellac	20,326,467	2,176,732
Bleached shellac	493,779	70,731

* Source: Chem. Div., Bureau of Foreign and Domestic Commerce.

PLASTIC PAINTS, COLD WATER PAINTS, AND CALCIMINES—SUMMARY, BY MONTHS, 1937*

Item	Yearly Totals Total 1937	Yearly Totals Total 1936	December	November	October	September	August	July	June	May	April	March	February	January
Plastic Paints, Total: Pounds	6,646,615	6,397,855	323,334	443,911	486,887	551,863	632,364	570,750	632,853	597,684	661,296	790,227	509,610	445,836
Value	$319,273	$313,882	$22,283	$34,369	$41,362	$48,611	$53,236	$47,560	$52 771	$49,115	$51,574	$51,533	$34,768	$32,091
Paste:														
Casein Bound—Pounds	1,158,062	†	18,079	78,861	110,381	168,904	184,142	136,594	142,888	117,783	97,950	58,210	22,705	21,565
Value	$149,005	†	$2,325	$10,463	$14,410	$22,037	$22,630	$17,260	$18,261	$15,109	$12,921	$7,738	$2,982	$2,869
All Other Plastic Paste—														
Pounds	361,355	†	18,415	26,098	26,504	24,091	23,653	35,974	36,312	28,494	48,553	29,913	37,989	25,859
Value	$35,123	†	$2,113	$2,720	$2,847	$2,550	$2,427	$3,429	$3,203	$2,714	$4,415	$3,074	$3,161	$2,470
Dry Powder, total: Pounds	5,127,198	4,967,256	246,840	338,952	350,002	358,868	424,569	398,182	453,653	451,407	514,793	702,104	448,916	398,912
Value	$335,145	$339,467	$17,845	$21,186	$24,105	$24,024	$28,179	$26,871	$31,907	$31,292	$34,238	$40,721	$28,625	$26,752
Casein Bound—Pounds	3,125,923	3,261,295	183,535	222,732	234,107	220,906	250,437	263,335	303,735	291,230	306,236	314,528	269,422	255,710
Value	$235,713	$252,207	$13,121	$15,460	$17,994	$17,402	$19,271	$19,835	$23,965	$22,556	$23,913	$23,181	$19,685	$19,202
Glue Bound—Pounds	2,001,275	1,705,961	103,305	116,220	115,895	127,962	174,132	134,847	149,918	160,177	208,557	387,566	179,494	149,202
Value	$99,432	$87,260	$4,724	$5,726	$6,111	$6,622	$8,908	$7,036	$7,342	$8,736	$10,325	$17,540	$8,940	$7,422
Cold-Water Paints (Paste or Dry Powder Form), Total:														
Pounds	41,661,214	2,211,965	2,717,265	3,225,794	3,384,470	3,664,894	3,557,969	3,994,283	4,329,043	4,598,563	3,979,120	3,085,549	2,912,294	
Value	$3,095,802	$164,312	$207,127	$244,935	$252,810	$268,693	$261,351	$303,474	$324,122	$336,570	$297,255	$229,100	$206,053	
Exterior, total: Pounds	12,933,498	602,980	866,787	1,051,990	1,189,976	1,123,384	1,237,926	1,416,891	1,548,278	1,534,342	991,872	743,139	635,933	
Value	$874,953	$40,027	$57,726	$73,011	$81,313	$77,692	$84,760	$100 065	$103,888	$100,023	$66,096	$49,992	$40,360	
Casein Bound—Pounds	4,309,686	256,892	290,476	399,660	360,567	420,712	429,884	571,451	$30,645	$29,885	$18,695	283,556	214,255	
Value	$238,840	$208,916	$11,119	$17,019	$22,618	$19,882	$22,769	$23,174						
Lime and/or Cement Bound—														
Pounds	8,623,812	6,261,162	400,961	609,955	761,514	790,316	762,817	817,214	987,007	976,827	989,898	656,042	459,583	411,678
Value	$636,113	$468,887	$28,908	$43,855	$55,992	$58,695	$57,810	$61,991	$76,891	$73,243	$70,138	$47,461	$32,955	$28,174
Interior, total: Pounds	28,727,716	13,307,279	1,608,985	1,850,478	2,173,804	2,194,494	2,541,510	2,320,043	2,577,392	2,780,770	3,064,221	2,987,248	2,342,410	2,226,361
Value	$2,220,849	$859,101	$124,285	$149,401	$171,924	$171,497	$191,001	$176,591	$203,409	$220,234	$236,547	$231,159	$179,108	$165,693
Casein Bound:														
Paste Form—Pounds	18,030,098	1,109,160	1,239,162	1,508,005	1,434,564	1,661,445	1,471,378	1,569,858	1,701,905	1,696,310	1,386,229	1,349,493		
Value	$1,599,907	$97,236	$113,038	$133,923	$127,582	$140,949	$127,215	$141,745	$155,076	$165,764	$151,453	$124,961	$120,965	
Dry Powder Form—														
Pounds	5,556,802	227,175	306,459	332,524	398,284	459,778	450,927	579,844	581,686	642,251	774,226	469,880	393,758	
Value	$480,802	$19,811	$27,061	$29,221	$34,514	$39,194	$38,671	$50,604	$51,541	$55,147	$65,514	$41,036	$28,488	
Glue Bound—Pounds	5,140,816	272,650	304,857	333,275	361,646	420,287	397,738	427,690	497,179	519,381	516,702	486,301	608,110	
Value	$140,140	$7,238	$9,302	$8,780	$9,401	$10,858	$10,705	$11,060	$13,617	$15,636	$14,102	$13,111	$16,240	
Calcimines, Total: Pounds	79,383,212	80,253,352	3,856,937	5,238,060	5,762,921	5,869,159	5,071,758	7,114,600	7,560,565	8,096,527	8,813,592	7,659,432	7,299,442	7,040,219
Value	$3,364,066	$3,395,437	$160,847	$214,027	$238,256	$250,591	$226,010	$290,193	$330,144	$357,143	$366,049	$332,591	$302,414	$295,801
Hot Water—Pounds	40,211,314	40,728,293	1,734,421	2,673,275	2,943,238	2,835,381	2,099,870	4,029,093	3,607,992	3,633,415	4,630,963	3,862,417	4,080,830	
Value	$1,569,086	$1,583,739	$67,812	$100,909	$111,187	$109,825	$83,887	$144,275	$145,842	$150,928	$181,264	$155,492	$156,430	
Cold Water—Pounds	39,171,898	39,525,059	2,122,516	2,564,785	2,819,683	3,033,778	2,971,888	3,085,507	3,952,573	4,463,112	4,182,629	3,797,015	3,218,612	2,959,800
Value	$1,794,980	$1,811,698	$93,035	$113,118	$127,069	$140,766	$142,123	$145,918	$184,302	$206,215	$184,785	$177,099	$145,984	$134,566

* Source: Dept. of Commerce, Bureau of the Census. † Comparative figures not available.

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Paints, Varnish, Lacquers, Shellac, Fillers, 1937

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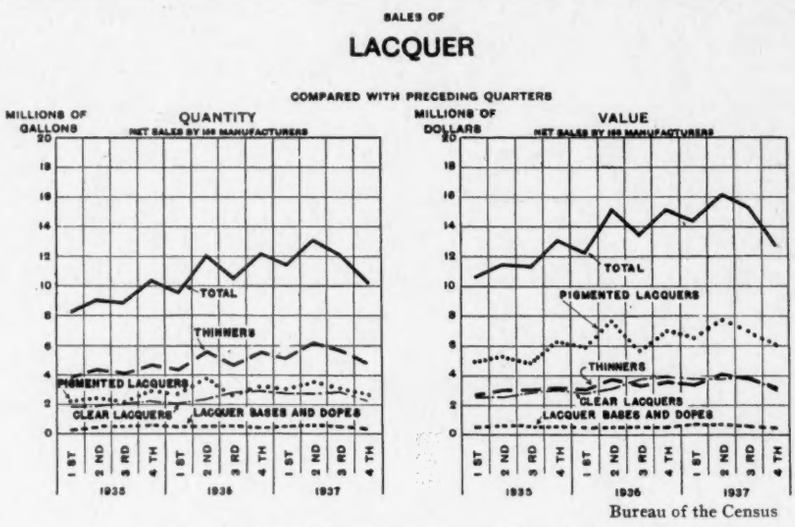
EXPORTS OF PAINTS, VARNISHES AND LACQUERS BY MONTHS AND TOTALS, 1937*

Product	January	February	March	April	May	June	July	August	September	October	November	December	Total 1937
Nitrocellulose, wet down and in sol.—Pounds..	134,247	270,631	293,414	266,683	489,632	349,929	164,430	396,710	465,543	423,486	389,792	472,150	4,116,647
Value	$31,147	$47,450	$55,400	$59,548	$92,220	$75,029	$33,244	$73,969	$85,205	$78,007	$73,205	$90,533	$794,957
Bituminous Paints—Value	$17,135	$12,830	$24,961	$37,614	$40,615	$26,593	$33,277	$23,945	$21,160	$47,969	$18,793	$26,525	$331,417
Paste Paint—Value	$30,531	$28,330	$32,938	$41,471	$32,962	$34,301	$37,174	$30,863	$29,551	$44,578	$55,067	$39,354	$407,120
Cold-water Paints, dry—Pounds	532,331	915,674	804,918	934,973	1,141,249	701,750	630,747	350,980	769,554	634,393	470,264	765,714	8,652,547
Value	$26,498	$46,411	$40,807	$48,072	$59,115	$39,916	$32,059	$21,141	$41,220	$35,957	$28,256	$39,344	$458,796
Value	51,781	66,521	56,349	81,087	74,012	58,040	46,760	50,866	71,901	54,013	88,318	771,297
Nitrocellulose Lacquers, pigmented—Gallons	$122,497	$140,751	$123,586	$174,982	$141,601	$147,864	$126,588	$104,360	$107,490	$156,504	$106,438	$183,452	$1,636,113
Value	11,057	17,733	11,747	21,055	20,070	17,193	17,588	16,835	15,295	14,798	14,002	23,350	200,723
Nitrocellulose Lacquers, clear—Gallons	$23,557	$37,390	$26,697	$49,403	$43,786	$39,004	$40,719	$39,000	$39,970	$39,271	$30,931	$47,754	$447,482
Value	73,995	87,748	61,279	104,480	84,308	73,869	97,924	65,348	60,860	82,483	69,673	90,612	952,579
Thinners for Nitrocellulose Lacquers—Gallons	$56,897	$62,968	$56,757	$75,557	$60,176	$58,438	$71,092	$48,532	$47,611	$54,671	$52,211	$63,637	$716,547
Value	199,620	224,475	248,594	241,872	257,567	209,227	258,547	229,376	221,879	215,629	163,889	223,005	2,693,680
Ready-mixed Paints, Stains, Enamels—Gallons	$336,787	$370,884	$402,382	$429,071	$454,317	$367,340	$464,475	$415,476	$384,276	$404,493	$297,873	$408,149	4,735,525
Value	43,214	34,567	40,306	48,916	37,595	36,416	51,367	44,756	35,591	38,985	32,812	41,272	485,797
Varnishes—Gallons	$54,632	$48,481	$54,165	$66,848	$49,969	$52,664	$64,611	$60,778	$49,448	$51,328	$47,014	$54,027	653,965
Value													

* Source: Bureau of Foreign & Domestic Commerce, Dept. of Commerce.



Quarterly Sales Totals of Lacquers and Thinners 1935-1937.

PAINT AND VARNISH EMPLOYMENT, PAY ROLLS, HOURS AND EARNINGS, 1936 AND 1937*

Month	Employment 1937	Employment 1936	Payrolls 1937	Payrolls 1936	Average Weekly Earnings 1937	Average Weekly Earnings 1936	Average Hours Worked per Week 1937	Average Hours Worked per Week 1936	Average Hourly Earnings 1937	Average Hourly Earnings 1936
January	128.0	107.1	120.3	91.8	25.91	23.80	41.2	39.8	63.0	59.5
February	131.2	107.2	127.2	93.5	26.74	24.14	42.5	40.4	63.1	59.8
March	134.6	108.1	133.1	95.9	27.21	24.31	42.9	41.2	63.5	59.0
April	138.2	111.9	142.1	100.7	28.12	25.01	43.4	42.3	65.0	59.1
May	140.2	114.5	145.0	106.0	28.47	25.68	43.7	43.7	65.4	58.8
June	138.9	115.3	142.7	106.6	28.54	25.67	42.5	43.3	67.4	59.3
July	136.3	112.9	138.3	100.4	27.86	24.83	41.0	41.5	68.2	59.9
August	132.8	111.3	135.4	100.1	28.06	25.27	40.7	41.8	69.0	60.3
September	132.4	113.3	131.6	100.5	27.53	24.87	39.6	41.1	69.6	60.4
October	131.6	128.6	134.1	119.6	28.17	25.66	40.5	42.6	69.7	60.3
November	128.0	125.3	124.8	116.8	26.95	25.61	38.8	42.2	69.6	60.9
December	....	127.5	....	121.6	....	26.24	...	42.3	...	62.3

* Source: U. S. Dept. of Labor. Indexes are based on 3-year average 1923-25 = 100. Indexes beginning with October 1936 are adjusted to 1933 Census of Manufactures and are not comparable to those published prior to October 1936.

Paint Exports Set 7 Year Record

U. S. exports of pigments, paints, and varnishes valued at $21,550,000 in '37, were the highest in 7 years, and compared with shipments of such products valued at $17,788,000 during '36. Every leading item entering into the trade shared in the gain last year, particularly ready-mixed paints, varnishes, lacquers and pigments.

Taken together, exports of ready-mixed paints, varnishes and lacquers exceeded 5,000,000 gals., valued at $8,191,000 last year, which compares with 4,101,000 gals. valued at $6,605,500 in '36, according to preliminary figures. In this group, shipments of ready-mixed paints increased from 2,153,000 to 2,693,500 gals.; varnishes from 448,000 to 486,000 gals.; and lacquers from 1,500,000 to 1,916,000 gals.

Other paint materials recording gains in '37 compared with the preceding year, included paste and semi-paste paints, shipments of which increased from 2,229,000 to 2,744,000 lbs.; kalsomines or cold water paints from 7,832,000 to 8,652,500 lbs.; and bituminous paints, in value, from $266,000 to $331,500.

Exports of chemical pigments advanced sharply to 214,000,000 lbs. valued at $11,524,000 in '37, from 180 million lbs. valued at $9,603,000 in the preceding year. Shipments of carbon black, included in this classification, increased from 155 to 184 million lbs. during these periods. Value of mineral earth pigments increased in value from $568,600 in '36 to $630,600 during the year just ended, according to preliminary statistics.

Imports of Raw Materials

Imports of materials used mainly in paints, varnishes, and lacquers were valued at $66,000,000 in '37 against $50,000,000 during preceding year—a value gain of 32%. Imports of flaxseed increased from 17,653,000 to 35,000,000 bu.; tung oil from 135,000,000 to 175,000,000 lbs.; and varnish gums from 69 to 86½ million lbs. Receipts of perilla declined from 118,000,000 lbs. in '36 to 43,600,000 lbs. during the year just ended. Only small quantities arrived in earlier part of year, but trading became more active following outbreak of hostilities in China, which threatened our supply of tung oil.

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Agricultural Chemicals

Continuous manufacture calcium metaphosphate from a calcium-bearing material. No. 2,113,574. Harry A. Curtis, Knoxville, Tenn.

Method concentrating phosphatic fines, first adding a selective agglomeration and flotation agent to phosphate-bearing material. No. 2,113,727. Jesse Pankey Hall, Bartow, and William Hodges, Plant City, Fla., to Swift and Co., corp. of Ill.

Manufacture guanidine sulfate from calcium cyanamide. No. 2,114,280. Jacob W. H. Aldred, near Sheffield, Ala.

Production dicalcium phosphate and sodium nitrate from phosphate rock. No. 2,114,600. Markus Larsson, Berlin, Germany, to Kunstdunger Patent Verwertungs A.G., Glarus, Switzerland.

Cellulose

Production sheeted cellulose fiber for conversion into cellulose derivatives. No. 2,112,115. Geo. A. Richter, to Brown Co., both of Berlin, N. H.

Production cellulose fiber of low solution viscosity for conversion into cellulose derivatives. No. 2,112,116. Geo. A. Richter to Brown Co., both of Berlin, N. H.

Method imparting enhanced hardness to porous cellulosic material; subjecting same to terpin hydrate at temperature at or above M.P. of latter. No. 2,112,245. Christopher Luckhaupt, Jamaica, N. Y.

Method uniting cellulose acetate to material of a kind to which it is incapable of being readily caused to adhere. No. 2,112,249. Wm. Henry Moss, London, England, to Celanese Corp. of America, corp. of Del.

Preparation cellulose xanthate solutions. No. 2,112,576. Geo. A. Richter to Brown Co., both of Berlin, N. H.

Conditioning cellulose fiber for conversion into cellulose acetate; using mixture of hydrogen peroxide and acetic acid, then acetylating in presence of water. No. 2,112,999. Geo. A. Richter to Brown Co., both of Berlin, N. H.

Preparation organic derivative of cellulose; treating cellulose with reaction mixture containing boron trifluoride as the catalyst. No. 2,113,293. Jos. B. Dickey to Eastman Kodak Co., both of Rochester, N. Y.

Preparation a mixed fatty acid ester of cellulose, by reacting upon cellulose with an esterification bath containing an organic acid anhydride, fatty acid groups, an acylation catalyst, and a beta-alkoxyalkyl acetate. No. 2,113,300. Chas. R. Fordyce and John Emerson, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Preparation cellulose esters containing a predominating proportion of fatty acid groups of 3-4 carbon atoms. No. 2,113,301. Howard S. Gardner, Jr., Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Preparation low viscosity cellulose acetate propionate; using an esterifying bath containing less than 7 parts of liquid consisting of propionic anhydride, propionic acid, acetic acid, and a sulfuric acid catalyst. No. 2,113,304. Carl J. Malm, Rochester, N. Y., and Chas. L. Fletcher, Kingsport, Tenn., to Eastman Kodak Co., Jersey City, N. J.

Preparation cellulose mixed ester compositions containing toluene and an alcohol. No. 2,113,305. Carl J. Malm, Rochester, N. Y., and Chas. L. Fletcher, Kingsport, Tenn., to Eastman Kodak Co., Jersey City, N. J.

Cellulose derivative compositions; comprising a fatty substance of the group of non-drying and semi-drying fatty glycerides, and an aryl boric acid as rancidity inhibitor. No. 2,113,653. James Karr Hunt and George Henry Latham to du Pont, all of Wilmington, Del.

Bleaching process for fibrous cellulose containing material; subjecting same to bath of sodium hypochlorite and a buffer. No. 2,113,906. Edwin P. Sherman to Geo. E. Sherman Co., both of Brooklyn, N. Y.

Preparation alkali cellulose and derivatives; using aqueous caustic alkali solution containing a wetting agent. No. 2,114,605. William D. Nicoll to du Pont, both of Wilmington, Del.

Chemical Specialty

Non-injurious dry cleaning liquid composed of: benzol, Stoddard solvent, denatured alcohol, amyl acetate, distilled water, castile soap, and reaction products of oleic acid, ammonia water, and caustic potash. No. 2,111,571. Robert H. Price, Colorado Springs, Colo.

Non-phytocidal mineral spray oil; a petroleum distillate fraction soluble in liquid sulfur dioxide at 30°F. and insoluble in same at —30°F., having gravity of 13° A. P. I. No. 2,111,581. Ulric B. Bray, Palos Verdes Estates, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Rust and incrustation removing and preventing substance for use with boiler water: an aqueous dilution of the resultant of a heated mixture of Agave plant juice, dry field corn, and lactic acid. No. 2,111,684. Henry G. Venable, San Antonio, Tex.

Fireproofing material comprising aluminum sulfate, ammonium sulfate, ammonium chloride, sodium borate, boric acid, all dissolved in water, in presence of potassium silicate, carbon tetrachloride, and ethylene dichloride. No. 2,111,704. Julius Sumichrast and Sandor A. Molnar, New York City.

Electric resistance material; forming intimate mixture of pulverized ferrosilicon and Hattenleidelheimer cláy, adding water, finally sintering dried paste forms in gas mixture composed of nitrogen and hydrogen. No. 2,111,708. Johannes J. A. Ploos van Amstel to N. V. Philips' Gloeilampenfabrieken, both of Eindhoven, Netherlands.

Resistance compound for use in manufacture of resistors. No. 2,111,742. Sidney Bloomenthal, Merchantville, N. J., to Radio Corp. of America, corp. of Del.

Bactericidal compounds: p-(benzylamino) benzenesulfonamides. No. 2,111,768. Paul Emile Charles Goissedet and Robert Ludovic Despois, Choisy Le Roi, France, to Societe des Usines Chemiques Rhone-Poulenc, Paris, France.

Improved lubricating oil comprising a viscous petroleum hydrocarbon fraction containing a solid waxy constituent, blended with a high molecular weight ether condensation product containing a long aliphatic hydrocarbon chain. No. 2,111,769. Geo. De Witt Graves to du Pont, both of Wilmington, Del.

Non-volatile liquid vehicle for "cold color" printing requiring application of heat to convert it to hardened condition; comprising varnish resin, rosin-glycerol ester, rosin, drying oil, and metallic drier dissolved in chlorinated diphenyl. No. 2,111,802. Frank Graf Oswald, Manhasset, N. Y., to John W. Masury & Son, Brooklyn, N. Y.

Production improved high viscosity index lubricating oils. No 2,111,831. Howard R. Batchelder, Hammond, Ind., and Ward E. Kuentzel, Whiting, Ind., to Standard Oil Co., Chicago, Ill.

Insecticide of formula $R_1\text{-}N = N\text{-}R_2\text{-}(NH_2)$, where R_1 and R_2 denote interchangeable aryl nuclei, R_1 being a single benzene nucleus and R_2 a naphthyl nucleus. No. 2,111,879. Donald L. Vivian and Herbert L. J. Haller, Washington, D. C., to free use of Public in Territory of the U. S.

Solid lubricant; major proportion of lubricating oil, a lime soap, and at least 15% petrolatum whereby bleeding or sweating of oil is prevented. No. 2,111,907. John C. Zimmer, Elizabeth, N. J., and Arnold J. Morway, Jackson Heights, L. I., N. Y., to Standard Oil Development Co., corp. of Del.

Wetting agents and detergents; improved acid derivatives of hydrocarbon oils and products thereof. No. 2,111,911. Stewart C. Fulton and Hans G. Vesterdal, Elizabeth, N. J., to Standard Oil Development Co., corp of Del.

Manufacture linoleum cement. No. 2,111,992. Edwin Brew Robinson, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Textile-fibre drawing roll; characterized in that material forming its curved surface consists of a non-fibrous, difficultly ignitible cellulosic mass which encloses a finely divided elastic material. No. 2,112,095. Fritz Hoffmann, Ladiz, Poland.

Friable, chlorinated naphthalene wax. No. 2,112,109. Wm. J. Marsh, Niagara Falls, N. Y., to Hooker Electrochemical Co., New York City.

Road surfacing product; stable emulsion in water of a bituminous material, emulsion containing a finely pulverized coal filler in the non-dissolved state. No. 2,112,168. Pierre Marcel Andre Leaute to Societe De Recherches & De Perfectionnements Industriels, both of Puteaux, France.

Preparation calcareous base plaster of modified porosity and having a predetermined water absorption figure; incorporating the dry reaction product of molten rosin and excess calcium oxide with a calcareous base, gauging with water, and setting. No. 2,112,302. John P. C. Peter, Westfield, N. J., to American Cyanamid & Chemical Corp., New York City.

Improved lubricant comprising a hydrocarbon lubricating oil and an oil soluble metallo organic compound. No. 2,112,305. Raphael Rosen, Cranford, N. J., to Standard Oil Development Co., corp. of Del.

Cable comprising conductors, insulation wound around each conductor, and a non-conductor ion adsorbing agent dispersed between windings of insulation. No. 2,112,322. Kenneth S. Wyatt to Detroit Edison Co., both of Detroit, Mich.

Manufacture lubricating oils. No. 2,112,350. John E. Schulze to Red River Refining Co., both of Chicago, Ill.

Parasiticidal composition stabilized against atmospheric inactivation, containing a thio-diarylamine and an antioxidant. No. 2,112,381. Paul L. Salzberg to du Pont, both of Wilmington, Del.

Manufacture leather-rubber material. No. 2,112,517. Donald E. Cable, Rutherford, N. J., to U. S. Rubber Co., New York City.

Heat producing composition for permanent waving of hair; composed of copper acetate, copper oxide, and finely divided metallic magnesium. No. 2,112,674. Carl J. Lewit to Industrial Development & Research Labs., both of Atlanta, Ga.

Fly spray comprising aliphatic ester of the formula (CNS)-R, in which R is an aliphatic radical of at least 6 carbon atoms; spray characterized by a high paralytic and high lethal effect. No. 2,112,688. Euclid W. Bousquet, Wilmington, and Paul L. Salzberg, Edge Moore, Del., to du Pont, Wilmington, Del.

Manufacture a stable cutting oil base of high sulfur content from petroleum oil. No. 2,112,677. Irving E. Musket, Pittsburgh, Pa., to Gulf Research & Development Co., corp. of Del.

Mineral oil containing unsaturated aliphatic hydrocarbons and residual unsaturated aromatic hydrocarbons; oil forming less than 5-10% by weight of sludge when heated in presence of metallic copper for 55 days in oven maintained at temperature of about 110°C. No. 2,112,735. Frank M. Clark, Pittsfield, Mass., to General Electric Co., corp. of N. Y.

Electroplating bath for producing bright deposit of a nickel group metal, composed of an aqueous solution of an inorganic-salt of a nickel group metal and a sulfonic acid compound. No. 2,112,818. Virgil H. Waite, Elyria, O., to McGean Chemical Co., Cleveland, O.

Oil blending agent; containing an aliphatic primary hydroxy amine having more than 5 carbon atoms, being capable of reducing oxygen absorption rate with increasing sludging properties of the oil. No. 2,113,150. Peter J. Wiezevich, Elizabeth, N. J., now by judicial change of name Peter J. Gaylor, to Standard Oil Development Co., corp. of Del.

Manufacture abrasive bodies having artificially produced voids from abrasive materials and synthetic resin binders. No. 2,113,185. Rudolf Thilenius, Frankfort-am-Main, and Josef Schneider, Oberursel, Germany, to Deutsche Gold-und Silber Scheideanstalt vormals Roessler, Frankfort-am-Main, Germany.

Treatment fibers prior to their use in a manufacturing process; subjecting them to bath containing solution of water and stearate of sodium, then to further bath containing water and hydrochloric acid. No. 2,113,361. Heriberto Uribe Montes de Oca, Mexico, D. F., Mexico.

Production calcium sulfate plaster. No. 2,113,370. John Stanley Dunn and Francis Himsworth, Norton-on-Tees, and Victor Lefebure, London, England, to Imperial Chemical Industries, London, England.

Calcium sulfate plaster. No. 2,113,375. Francis Robt. Himsworth and John Stanley Dunn, Norton-on-Tees, England, to Imperial Chemical Industries, London, England.

Production liquid drier for paints and varnishes, having as an active ingredient, an oil-soluble metal salt of a non-aromatic organic acid. No. 2,113,496. Leo Roon, New York County, N. Y., and Walter Gotham, Union Township, Union Co., N. J., to Nuodex Products Co., Elizabeth, N. J.

Electrodeposition of silver, in form of hard, bright deposits requiring little or no polishing, from an alkali metal-cyanide bath. No. 2,113,517. Alan Richard Powell and Emyr Conwy Davies to Johnson, Matthey & Co., all of London, England.

Method cementing discrete pieces to produce built-up products, using bonding agent. No. 2,113,533. Willis A. Boughton, Cambridge, and Wm. R. Mansfield, Boston, Mass., to New England Mica Co., Waltham, Mass.

Wood preservative; toxic liquid hydrogenation product of coal tar residuum boiling above 350°C. No. 2,113,589. Jacquelin E. Harvey, Jr., Hapeville, Ga., one-half to Southern Wood Preserving Co., Atlanta, Ga.

Lubricant composed of a lubricating oil maintained in liquid condition, depolymerized rubber, and an amine agent for stabilizing composition. No. 2,113,599. John M. Musselman to Standard Oil Co. (Ohio), both of Cleveland, O.

Preparation quaternary diammonium compounds. No. 2,113,606. Ludwig Taub and Friedrich Leuchs, Wuppertal-Elberfeld, Germany, to Alba Pharmaceutical Co., New York City.

Spray adapted for controlling coloring of plants; composed of Malachite green, Auramine O, crystal violet, and water. No. 2,113,625. John Monteith, Jr., Washington, D. C., to free use of People of the U. S.

Abrasive member comprising particles of abrasive material, and a binder therefor comprising reaction product of a magnesium oxychloride cement, and a reagent. No. 2,113,729. Dean S. Hubbell to H. H. Robertson Co., both of Pittsburgh, Pa.

Improved lubricating oil having a hydrocarbon base and a mineral oil soluble synthetic ester. No. 2,113,752. Peter J. Wiezevich, Elizabeth,

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N. J., by judicial change of name Peter J. Gaylor, to Standard Oil Development Co., corp. of Del.

Improved lubricant, comprising a hyrdocarbon oil and a neutral ester of furoic acid. No. 2,113,754. John C. Zimmer, Hillside, and Arno'd J. Morway, Roselle, N. J., to Standard Oil Development Co., corp of Del.

Fluid road surfacing product; mixture of a bituminous body and a finely pulverized coal filler. No. 2,113,794. Pierre Marcel Andre Leaute to Societe de Recherches et de Perfectionnements Industriels, both of Puteaux, France.

Lubricant comprising a hydrocarbon oil and a sulfurized monohydric or dihydric ester of linoleic acid. No. 2,113,810. Bert H. Lincoln and Waldo L. Steiner to Continental Oil Co., all of Ponca City, Okla.

Lubricant containing hydrocarbon oil and a sulfurized monohydric or dihydric ester of organic acids, the glycerides of which are normally present in corn oil. No. 2,113,811. Bert H. Lincoln and Waldo L. Steiner to Continental Oil Co., all of Ponca City, Okla.

Fused refractory obtained by melting and fusion of magnesia, silica, and iron oxide. No. 2,113,818. John D. Sullivan to Battelle Memorial Institute, both of Columbus, Ohio.

Preparation fatty acid condensation products; reaction of a higher molecular fatty acid halide, with a dry hydrolysis product of a protein to form a wetting, emulsifying, sudsing, and detergent agent. No. 2,113,819. Nathaniel Beverley Tucker, Glendale, Ohio, to Procter & Gamble Co., Cincinnati, Ohio.

Adjusting surface tension of embalming fluids through use of a soluble alkali salt of an acid derivative of a higher aliphatic alcohol. No. 2,113,842. Hilton Ira Jones, Wilmette, Ill., to Naselmo Corp., Chicago, Ill.

Manufacture mirror, consisting of transparent material, an adherent film of silver exclusively in the colloidal state on surface of latter, and a protective backing of electro-deposited lead on silver film. No. 2,113,977. Albert Moore Barnes, Acton, London, Eng., to Duro-Ray Limited, London, England.

Electrolytic bath for electrodeposition of chromium, comprising chromic acid and a reaction product of chromic acid, a chromium salt, an alkali metal hydroxide, and an alkali metal salt of an organic acid oxidizable by chromic acid. No. 2,114,002. Oskar Kramer, Leipzig, Germany.

Production bright or mirror-like deposits of a nickel group metal; electrodepositing metal from an aqueous acid bath. No. 2,114,006. Virgil H. Waite, Berea, Ohio, to McGean Chemical Co., Cleveland, Ohio.

Insulating compound; pasty filling composition, consisting of a cable insulating oil and a fibrous pulp of non-conducting material immersed in oil. No. 2,114,028. Harold F. Ormerod, Yonkers, N. Y., to Anaconda Wire & Cable Co., New York City.

Stable insecticidal emulsion, comprising soap of a high molecular weight fatty acid and an alkylolamine, polyhydric alcohol, water, lead arsenate, and hydrocarbon oil. No. 2,114,125. Arthur Gustav Kaufmann, Associated, Calif., to Tide Water Associated Oil Co., corp. of Del.

Bonded abrasive article comprising abrasive grain and a bond therefor. No. 2,114,160. Maxwell L. Whitacre to Carborundum Co., both of Niagara Falls, N. Y.

Alkali silicate cement. No. 2,114,166. Peter de Leeuw to Carborundum Co., both of Niagara Falls, N. Y.

Spreader for aqueous toxic sprays; mixture of casein, powdered skimmed milk, and barium sulfate. No. 2,114,307. John F. Littooy, San Francisco, Calif.

Manufacture a thermal insulating unit; converting molten material into mineral wool fibres, and mixing with same a binding or skeletonizing material to form a stiff, form-retaining casing. No. 2,114,353. Edward R. Powell, Alexandria, Ind., to Johns-Manville Corp., New York City.

Semi-resilient ceramic floor tile section; using a rubber latex tile adhesive compound in its production. No. 2,114,474. Joseph Labra, Long Island City, N. Y.

Emulsion comprising oleaginous material, aqueous material, and a hydrophillic lipin. No. 2,114,490. Benjamin R. Harris, Chicago, Ill.

Lubricant having as its lubricating component a mixture of a viscous hydrocarbon oil and polymerized components which are active in raising viscosity index of the oil. No. 2,114,525. Egon Eichwald, Amsterdam, Netherlands, to Shell Devolpment Co., San Francisco, Calif.

Vermicide which contains an aliphatic compound with a sulfofluoride group bound in aliphatic linkage, and containing from 1 to 4 carbon atoms. No. 2,114,577. Gerhard Schrader, Opladen-Lutzenkirchem, Otto Bayer and Hans Kukenthal, Leverkusen-I.G. Werk, Germany, to Winthrop Chemical Co., New York City.

Process degumming natural silk contained in a pile fabric, pile containing organic derivative of cellulose; subjecting same to action of a hot degumming bath which contains sugar. No. 2,114,669. George Schneider, Montclair, N. J., to Celanese Corp. of America, corp. of Del.

Preparation bituminous road dressing; incorporating a mobile bitumen with an aqueous solution of an alicyclic acid soap to form an emulsion, adding a polyhydric alcohol, and applying resultant mixture to a mineral aggregate. No. 2,114,689. Arthur D. Smith, Park Ridge, Ill.

Prevention offset by application in a mist form to freshly printed surface of a mixture consisting of a liquid and powdered material. No. 2,114,792. Bruce A. Young to R. R. Donnell & Sons Co., both of Chicago, Ill.

Mineral oil composition; composed of a liquid oil waxy hydrocarbon, and in admixture therewith another compound. No. 2,114,812. Orland M. Reiff and Darwin E. Badertscher, Woodbury, N. J., to Socony-Vacuum Oil Co., New York City.

Lubricating grease consisting of a mineral lubricating oil, and saponified crude oxidized paraffin wax. No. 2,114,836. Benjamin Gallsworthy, Glenham, N. Y., and Joseph R. Scanlin, Fillmore, Calif., to Texas Company, New York City.

Production solid, homogeneous lubricating grease having extreme pressure characteristics; consisting of a sulfurized hydrocarbon lubricating oil and a lime soap of a fatty material. No. 2,114,843. Gus Kaufman, Beacon, N. Y., and Roy F. Nelson, Nederland, Tex., to Texas Co., New York City.

Viscose spinning bath having sp. gr. of from 1.260 to 1.350 at 40°C., containing sulfuric acid, sodium-, zinc-, and metal-sulfates. No. 2,114,915. Isaac P. Davis, Swarthmore, Pa., to American Viscose Corp., corp. of Del.

Coal Tar Chemicals

Preparation 4-normal alkyl halo phenol, wherein halogen substituent occupies the ortho position with respect to the hydroxyl group, and the alkyl group, contains at least 6 carbon atoms. No. 20,683. Reissue. Fred. F. Beicke to Regents of Univ. of Mich., both of Ann Arbor, Mich.

Preparation amino anthraquinone compounds. No. 2,112,258. Richard S. Wilder, Hamburg, N. Y., to National Aniline & Chemical Co., New York City.

Heterocyclic phenols; treating phenol having at least one free nuclear position available for condensation with reacting proportions of a β-ethylenic isothiocyanate in presence of an acidic catalyst as condensing agent. No. 2,112,445. Jos. B. Niederl, New York City.

Preparation 2.4-dinitro-6-cyclohexyl-phenol. No. 2,112,543. Ralph F. Prescott to Dow Chemical Co., both of Midland, Mich.

Preparation anthraquinonylguanidines and substituted anthraquinonylguanidines. No. 2,112,724. Martin Battegay, Mulhouse, France, to Calco Chemical Co., Bound Brook, N. J.

Purifying coke oven gas to recover fixed nitrogen in commercially available forms; first scrubbing gas with hot sulfuric acid. No. 2,113,002. Frederick D. Schreiber, Dormont, Pa.

Improved tars for use in road construction; adding to tar a polymerized vinyl compound. No. 2,113,144. Alfred Sirot, Bitterfeld, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture arylaminonaphthalene derivatives. No. 2,113,146. Paul Virck and Max Schulze, Wolfen Kreis Bitterfeld, Germany, to General Aniline Works, New York City.

Carbonizing solid carbonizable fuel and cooling carbonized residue in a single vessel. No. 2,113,520. Jos. Herbert Smith, Elstree, and Hugh Thurston Cohen, Bushey, England, to Humphreys and Glasgow, London, England.

Refining commercial phenolic compounds contaminated with nitrogenous bases; distilling same under reduced pressure in presence of strong acid. No. 2,113,951. Royal L. Shuman, Newark, N. J., to Celluloid Corp., corp. of New Jersey.

Production phthalide; catalytically hydrogenating in liquid phase, at temperature between 150° and 200°C., a lower alkyl mono ester of phthalic acid to phthalide. No. 2,114,696. Paul Rolland Austin and Francis John McCall to du Pont, all of Wilmington, Del.

Coatings

Process and apparatus for coating roofing. No. 2,111,761. Clarence R. Eckert, Englewood, N. J., to Barrett Co., New York City.

Preparation stereotype mat; using coating mixture in process. No. 2,112,023. Harry J. Hosking, Sea Cliff, and Alexander R. Bradie, Brooklyn, N. Y., to Foster D. Snell, Inc., Brooklyn, N. Y.

Laminated textile fabric for use in wearing apparel, having a cellulose derivative in only one layer; using a thermoplastic vinyl polymer cement in process. No. 2,112,030. Gustave Klingenstein, Maplewood, N. J.

Coating composition; a stable and durable film comprising an odoriferously innocuous and inoffensive latent germicidal aldehyde generating compound. No. 2,112,412. Isidor Wetchler, Woodhaven, N. Y.

Laminated article having a coating of synthetic rubber-like polymer. No. 2,112,544. Harold D. Rice, Barrington, R. I., to U. S. Rubber Products, New York City.

Strong, pliable insulating material of high dielectric strength; sheet material coated and partly impregnated with an insoluble and infusible resin. No. 2,112,732. Hermann C. Burmeister, Hennigsdorf, Germany, to General Electric Co., Schenectady, N. Y.

Air filter made from vegetable fibers coated with a film deposited from an emulsion of hydrocarbon oil-in-water containing a deliquescent salt and bentonite; film precluding combustion when momentarily subjected to flame. No. 2,112,799. Robt. C. Williams to Ironsides Co., both of Columbus, O.

Production solid equipotential cathode, in manufacture of which is used an active metal coating and an adhesive coating. No. 2,112,969. Aristote Mavrogenis, Milwaukee, Wis., to Radio Corp. of America, New York City.

Coating for blue print paper; composed of a light reducible ferric complex, a ferricyanide salt, and ammonium nitrate. No. 2,113,423. Clyde A. Crowley, Chicago, and Geo. H. Goodyear, Evanston, Ill., to Huey Co., Chicago, Ill.

Method finishing surface to produce multi-toned metallic effect; spattering on surface paint having thin vehicle, formed with a base selected from the group of oleoresin, resin and nitrocellulose, and diluted to viscosity of from one-half to 3 poises, containing also a coloring material and a metal powder. No. 2,113,449. Chas. W. Hoffman and John C. Schmidt, Kenmore, and Walter T. Flowers, Buffalo, N. Y., to Pratt and Lambert, Inc., Buffalo, N.Y.

Method coating ferrous materials with a copper-rich alloy. No. 2,113,667. Willis C. Swift, West Alexandria, Ohio, to American Brass Co., Waterbury, Conn.

Composite flexible fabric; having layer of vulcanized rubber compound adhering to a gum rubber layer, and a coating of halogenized natural resinous material. No. 2,113,718. John T. Callahan, Waban, Mass., to Archer Rubber Co., Milford, Mass.

Method lining hollow containers; applying lubricating coat of adhesive to one of the contacting surfaces. No. 2,113,728. Marion M. Harrison, Akron, Ohio, to B. F. Goodrich Co., New York City.

In combination with an article of quartz, a conductive member sealed directly therein, consisting of an oxidizable refractory metal having a very thin coating of rhodium. No. 2,113,984. Norman L. Harris and John W. Ryde, Middlesex, England, to General Electric Co., corp. of New York.

Method finishing surface of ferrous metal; forming chromate coating thereon by treating it with solution containing chromic acid and activator anions, then applying to coated surface a finish of paint or the like. No. 2,114,151. Gerald C. Romig, Elkins Park, Pa., to American Chemical Paint Co., Ambler, Pa.

Coating composition made from solution of chlorinated rubber in an organic solvent and an inert filler comprising sulfur in free state. No. 2,114,251. Paul Koch to J. R. Geigy A. G., both of Basel, Switzerland.

Production a varnish characterized by its resistance to the solvent effects of unheated petroleum hydrocarbons, such as gasoline. No. 2,114,391. Fred H. Lane, Hillsdale, N. Y., to Hercules Powder Co., Wilmington, Del.

Production artificial leather; using coating in process. No. 2,114,618. Knute F. Wallin, Brooklyn, N. Y.

Coating process; forming intimate mixtures, one consisting of alkali silicate and aluminum hydrate, the other of a fluosilicate, one or both mixtures containing a pigment and water, bringing mixtures together and applying resulting mixture as coating to a lithic surface before much thickening has occurred. No. 2,114,692. Julian P. Ward; Frank Felton, administrator of Julian P. Ward, deceased, to General Coating Co., all of Cleveland, Ohio.

Bath for and method of coating magnesium and its alloys, bath containing phosphate and chromate radicals. No. 2,114,734. Robert W. Buzzard, Kensington, Md.

Method producing resistant coatings on wood; by treatment with a varnish consisting of a solution in an organic solvent of a hardenable phenol-formaldehyde resin. No. 2,114,784. Wilhelm Otto Maisch, Stuttgart, Germany, to Hermann Frankel, Molkau, near Leipzig, Germany.

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Sealing coating composition; made from an ammonia casein solution in water, and a resin plasticizer comprising a condensation product of glycerol and boric acid. No. 2,114,985. Elmer B. Schuler, Lakewood, Ohio, to Glidden Co., Cleveland, Ohio.

Dyes, Stains, etc.

Production azo dyestuffs containing a heavy metal in a complex form. No. 2,111,559. Ernst Fellmer, Leverkusen-I. G.-Werk, Germany, to General Aniline Works, New York City.

Production stabilized diazo compounds for use in textile printing. No. 2,111,692. Kenneth Herbert Saunders and Maurice Arthur Thorold Rogers, Blackley, England, to Imperial Chemical Industries, Ltd., London, England.

Production mono-azo dyestuffs insoluble in water. No. 2,111,890. Ernst Fischer, Offenbach-am-Main, Germany, to General Aniline Works, New York City.

Preparation carbocyanine dyes. No. 2,112,140. Leslie G. S. Brooker and Frank L. White, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Coloration textiles; coupling thereon an azo coupling component. No. 2,112,276. Geo. Holland Ellis and Ernest Wm. Kirk, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Production azo dyestuffs. No. 2,112,403. Hans Krzikalla and Joachim Mueller, Ludwigshafen-am-Rhine, Bernd Eistert, Mannheim, and Alfred Thurm, Dessau, Germany, to General Aniline Works, New York City.

Production polyazo dyestuffs. No. 2,112,405. Bertram Mayer and Ernst Alfred Henzi to Society of Chemical Industry in Basle, all of Basel, Switzerland.

Insoluble azo compounds for dyeing textiles; the coupling product of a diazotized aniline and a non-substantive aceto-acetyl anilide. No. 2,112,764. Miles A. Dahlen, Frithjof Zwilgmeyer, Newell M. Bigelow, and Robt. F. Deese, Jr., to du Pont, all of Wilmington, Del.

Production fast tints on vegetable fiber; using mixture containing a solid, difficultly volatile, diazotizable amine, a coupling component, alkali, and alkali metal nitrite. No. 2,112,864. Enrico Pool and Gerald Bonhote, Basel, and Carl Apotheker, Riehen, near Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Production azo dyestuffs. Nos. 2,112,919-20. Mordecai Mendoza and Francis Leslie Rose, Manchester, England, to Imperial Chemical Industries, London, England.

Method dyeing a cellulosic material; by impregnation with a basic paste containing a water-soluble diazo-imino derivative of aniline and a non-substantive aceto-acetyl-napththylamine, then subjecting to action of a mild acid. No. 2,113,029. Eugene A. Markush, Jersey City, N. J., to Pharma Chemical Corp., New York City.

Manufacture anthraquinone dyestuffs. No. 2,113,054. Frank Lodge, Blackley, Manchester, England, to Imperial Chemical Industries, London, England.

Production monoazo dyestuffs. No. 2,113,151. Richard Fleischhauer, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, New York City.

Production dyestuffs of the anthraquinone series. No. 2,113,231. Joseph Deinet, Milwaukee, Wis., to du Pont, Wilmington, Del.

Dyestuffs of the alizarine indigo type. No. 2,113,236. Ralph N. Lulek, Milwaukee, and Clarence F. Belcher, So. Milwaukee, Wis., to du Pont, Wilmington, Del.

Production basically substituted amino-acridine derivatives. No. 2,113,357. Fritz Mietzsch, Wuppertal-Elberfeld, and Hans Mauss, Wuppertal-Barmen, Germany, to Winthrop Chemical Co., New York City.

Preparation azo compounds. No. 2,113,597. Fritz Mietzsch and Josef Klarer, Wuppertal-Elberfeld, Germany, to Winthrop Chemical Co., New York City.

Body having red fluorescent properties; comprising a fluorescent layer containing a red fluorescent rhodamine dyestuff and a filtering layer containing an orange-colored filtering substance having properties of transmitting red light and of absorbing a portion of the light whose wave lengths are within the range of the rhodamine dyestuff absorption band lying within the visible portion of the spectrum. No. 2,113,973. Nicolaas Willem Hendrik Addink to N. V. Philips' Gloeilampenfabrieken, both of Eindhoven, Netherlands.

Process making directly from an original a diazotype print which is positive with respect to the original. No. 2,114,468. Lodewijk Pieter Frans van der Griten to Naamlooze Vennootschap Chemische Fabriek L. van der Grinten, both of Venlo, Netherlands.

Explosives

Ignition mixtures for percussion caps, small munitions, and primers; comprising normal lead trinitroresorcinate, a compound selected from group of barium and lead nitrates, antimony trisulfide, a frictioning agent, and 2.4.6-trinitro-1.3.5-triazidobenzene. No. 2,111,719. Bronislaw Zielinski, Stary Bierun, High Silesia, Poland.

Removal solvent from smokeless powder; subjecting same to action of a rapid current of a fixed gas and a vapor of a volatile liquid having no solvent action upon the powder. No. 2,112,256. Bernhart Troxler, Kenvil, N. J., to Hercules Powder Co., Wilmington, Del.

Removal solvent from smokeless powder; subjecting same to action of a current of a fixed gas and a vapor of an alcohol which is a non-solvent for the powder. No. 2,112,257. Leavitt N. Bent, Holly Oak, Del., to Hercules Powder Co., Wilmington, Del.

Preparation nitroisobutylglycerol trinitrate and nitroisobutylglycol dinitrate. No. 2,112,749. Willard de C. Crater, Newark, Del., to Hercules Powder Co., Wilmington, Del.

Instantaneous fuse, comprising fabric reinforcing member, a train of individual discrete particles of a detonating agent adhesively attached thereto, and an imperforate adherent rubber sheath. No. 2,113,004. Walter O. Snelling, Allentown, Pa., to Trojan Powder Co., corp. of N. Y.

Manufacture shot. Nos. 2,113,279-80. John M. Olin, Alton, Ill., and Philip A. Smith, Hamden, Conn., to Winchester Repeating Arms Co., New Haven, Conn.

Propellant powder; double-base powder grain whose surface is impregnated with diethyldiphenylurea and is capable of maintaining its ballistic stability when stored at temperature of 55°C. for one month. No. 2,113,418. Richard G. Woodbridge to du Pont, both of Wilmington, Del.

Fine Chemicals

Manufacture naphthostyril and 8-amino-l-naphthoic acid. No. 2,111,756. Arnaldo Corbellini, Milan, Italy.

Preparation alkyl aromatic acetic acid and homologs. No. 2,111,820. Adolf Steindorff and Carl Platz, Frankfort-am-Main, and Johann Rosenbach, Wiesbaden, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture sulfanilamide; submitting benzamide-p-sulfonamide to a Hofmann reaction. No. 2,111,913. Jonas Kamlet, Brooklyn, N. Y.

Hydroxylation aromatic organic compounds. No. 2,111,973. Vaman R. Kokatnur to Autoxygen, Inc., both of New York City.

Preparation organic mercury compounds. No. 2,112,129. Carl N. Andersen, Wellesley Hills, Mass., to Lever Bros. Co., corp. of Me.

Manufacture finely divided metal-oxides and other metal compounds by means of a molten metallic raw material and a fine grained, solid and hard substance. No. 2,112,189. Paul Beyersdorfer, Reichenbach (Oberlausitz), Germany, to Chemische Werke Schuster & Wilhelmy Patentverwertungs-Gesellschaft m. b. H., Berlin, Germany.

Manufacture an unexposed X-ray gelatine-silver-halide emulsion. No. 2,112,217. Walter Dewey Baldsiefen, Raritan Township, Middlesex County, N. J., to du Pont Film Mfg. Corp., New York City.

Manufacture halogenated pyridine derivatives. No. 2,112,223. Otto Schnider, Basel, Switzerland, to Hoffmann-LaRoche, Inc., Nutley, N. J.

Sheathed electrode; sheathed metal rod of which comprises an inner layer of a mixture of alkali-chlorides and an outer layer of a mixture of aluminum fluorides and alkali-chlorides. No. 2,112,578. Hans Rohrig, Lautawerk/Lausitz, Germany.

Process and composition for plastic deformation of metals; composition being liquid composed of finely divided matter of the type exemplified by ground silica, ground pumice stone, ground alumina, etc., dispersed in an oleaginous vehicle. No. 2,112,632. Harley A. Montgomery, Highland Park, Mich., to H. A. Montgomery Co., Detroit, Mich.

Manufacture a para-phenanthrolin derivative in which the carbon atoms in the 4-and 4′ positions are connected with one another by an atom selected from the group consisting of sulfur and selenium. No. 2,112,961. Hans Henecka, Wuppertal-Elberfeld, Germany, to Winthrop Chemical Co., New York City.

Light sensitive layer comprising a diazonium compound component, and a coloring component. No. 2,113,193. Jan Hendrick de Boer, to N. V. Philips' Gloeilampenfabrieken, both of Eindhoven, Netherlands.

Fine grain photographic developer comprising a developing agent and a strong acid salt of ethylenediamine. No. 2,113,312. Paul W. Vittum, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Color forming photographic developer, comprising an aromatic amino developing compound and a coupler compound. No. 2,113,330. Leopold D. Mannes and Leopold Godowski, Jr., Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Preparation salicylic acid derivatives. No. 2,113,374. Robt. A. Hall, Brooklyn, N. Y., to Colgate-Palmolive-Peet Co., Jersey City, N. J.

Organic mercury compounds of the formula $RHgR_1$ in which R represents an aromatic structure and in which none of the carbon atoms has direct linkage with any element other than hydrogen, carbon, and mercury. No. 2,113,565. Carl N. Andersen, Wellesley Hills, Mass., to Lever Bros. Co., corp. of Me.

Preparation aromatic mercury salts of aldehydo and ketonic acids. No. No. 2,113,566. Carl N. Andersen, Wellesley Hills, Mass., to Lever Bros. Co., corp. of Me.

Production aryl mercury oxygenated compounds of arsenic, antimony, or bismuth. No. 2,113,567. Carl N. Andersen, Wellesley Hills, Mass., to Lever Bros. Co., corp. of Me.

Production diazotype photographic prints from a support coated with a light sensitive diazotype compound capable of coupling under acid conditions. No. 2,113,944. Werner Paul Leuch, Denmark Hill, London, England, to Eugene Dietzgen Co., New York City.

Production organic mercury compound of the formula $RHg.R_1$. No. 2,114,011. Carl N. Andersen, Watertown, Mass., to Lever Brothers Co., corp. of Me.

Preparation aromatic mercury alcoholates of salts of hydroxy carboxylic acids; having formula $(RHg)\ XR_1$. No. 2,114,012. Carl N. Andersen, Wellesley Hills, Mass., to Lever Brothers Co., a corp. of Maine.

Process reacting acetylsalicylic acid and an aliphatic polyhydroxyalcoholate of an alkaline earth metal and recovering product formed. No. 2,114,541. Clemmy O. Miller and Arthur E. Siehrs, Chicago, Ill.

Glass and Ceramics

Manufacture frosted glass, immersing glass in bath of molten lithium compound sufficiently long to produce frosting of desired intensity. No. 2,111,576. Olus J. Stewart, Lexington, Ky.

Manufacture ceramic articles of which silicon is an essential constituent. No. 2,112,777. Max Hauser, Lausanne, Switzerland.

Glass batch for colorless transparent container glass and the like, including barium sulfate and a metallic reducing agent. No. 2,113,195. Francis C. Flint, Zanesville, O., to Hazel-Atlas Glass Co., Wheeling, W. Va.

Manufacture laminated glass. No. 2,113,764. Maurice L. Macht, Jersey City, N. J., to du Pont, Wilmington, Del.

Manufacture laminated glass. No. 2,113,767. Louis Paggi, Belleville, N. J., to du Pont, Wilmington, Del.

Production refined, molten, siliceous material, to form sintering glass batch. No. 2,114,545. Games Slayter, Newark, O., to Owens-Illinois Glass Co., corp. of Ohio.

Manufacture porous filter bodies of particles of glass; using a plastic paste in process. No. 2,114,748. Paul Prausnitz to Jenaer Glaswerk Schott & Gen., both of Jena, Germany.

Industrial Chemicals, etc.

Preparation dispersible sulfur; heating same to temperature of about 135° C., then adding solid sugar with agitation. No. 2,111,552. Arthur D. Chambers and John H. Sachs, to du Pont, all of Wilmington, Del.

Continuous and selective hydrogenation and removal of hydrogenation byproducts of fatty acid ester type oils. No. 2,111,573. Moreland W. Schuman, Los Angeles, Calif.

Gasification of fine-grained solid fuels. No. 2,111,579. Fritz Winkler and Eduard Linckh, Ludwigshafen-on-the-Rhine, Germany, to I. G., Frankfort-on-the-Main, Germany.

Manufacture formaldehyde; partially dehydrogenating methanol, passing same in presence of water over a metal catalyst at temperature between 450° and 750° C. No. 2,111,584. James F. Eversole, Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Production metallic magnesium; first reacting magnesium chloride with hydrogen at high temperature. No. 2,111,661. Karl Ebner, Oberursel, near Frankfort-on-the-Main, Germany, to American Lurgi Corp., New York City.

Producing and recovering gas containing CO_2 in a rotary kiln having its feed end received and freely rotatable in a hood. No. 2,111,783. Eugene A. Hults, Saltville, Va., to Mathieson Alkali Works, Inc., New York City.

Process and apparatus for removal of impurities from titanium sulfate

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solutions. No. 2,111,788. Ignace J. Krchma, Brooklyn, Md., to du Pont, Wilmington, Del.

Preparation concentrated aqueous caustic solution by dialysis of caustic into dilute aqueous caustic solution. No. 2,111,808. Arthur W. Saddington and Arlie P. Julien, Syracuse, N. Y., to Solvay Process Co., New York City.

Preparation secondary amines: condensation product of 2,4-diphenylaniline and a hydroxy compound. No. 2,111,863. Max M. Levine, Anniston, Ala., to Monsanto Chemical Co., St. Louis, Mo.

Selective chlorination of benzene to favor formation of monochlorbenzene; passing chlorine gas into benzene in presence of stannic chloride. No. 2,111,866. Jos. R. Mares to Monsanto Chemical Co., both of St. Louis, Mo.

Production sulfurized terpenes, reacting a terpene and sulfur in absence of air at temperature of from about 80° to 200° C. No. 2,111,882. Jos. N. Borglin to Hercules Powder Co., both of Wilmington, Del.

Manufacture ethylene from oil. Nos. 2,111,899-900. Theo. Nagel, Brooklyn, N. Y.

Manufacture basic copper arsenate, capable of being suspended directly in water to form a highly stable suspension. No. 2,112,102. Eberhard Klumpp, Wandsbeck, near Hamburg, Germany.

Preparation acylmethylene derivatives of arylothazolines and aryloselenazolines. No. 2,112,139. Leslie G. S. Brooker and Frank L. White, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Production substituted malonic esters. No. 2,112,162. John David Kendall to Ilford, Ltd., both of Ilford, Essex, England.

Recovery catalytically active molybdenum sulfide. No. 2,112,292. Wm. H. Jones, Baton Rouge, La., to Standard-I. G. Co.

Precipitation aqueous cyanide solution containing dissolved metal cyanides. No. 2,112,298. Louis D. Mills and Thos. B. Crowe, Palo Alto, and Joye C. Haun, San Francisco, Calif., to Merrill Co., San Francisco, Calif.

Production new decylene glycols; a 1, 3-glycol having ten carbon atoms in its molecule. No. 2,112,319. Jacob N. Wickert, Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Production molding and addition agent, simultaneously pulverizing and mixing coal and clay in a mechanical pulverizer in presence of a carrier gas. No. 2,112,333. Joshua A. Crew to Ayers Mineral Co., both of Zanesville, O.

Treatment Chinawood oil; heating same in contact with air to 250° to 500° F., until viscosity is between 3 and 150 poises, adding solvent, and aging in contact with air. No. 2,112,354. Alfonso M. Alvarado to du Pont, both of Wilmington, Del.

Production synthetic tans; reacting a water-soluble salt of a hydroxy sulfonic acid of an aliphatic-aromatic compound with formaldehyde and an ammonia base. No. 2,112,361. Heinrich Fischer, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Froth flotation of coal, agitating and aerating an aqueous suspension of coal in presence of an emulsified mineral oil. No. 2,112,362. Jos. Lincoln Gillson and Chas. Titus Mentzer, Jr., to du Pont, all of Wilmington, Del.

Manufacture light-weight aggregate; burning fragments of naturally formed siliceous material containing carboniferous matter, while fragments are coated with a non-combustible divided material which seals surfaces of fragments. No. 2,112,380. Carl M. Price to Eastman M. Markell, both of Berkeley, Calif.

Production hydroxyaralkylamino organic sulfonates. No. 2,112,434. Herman A. Bruson to Rohm & Haas Co., both of Phila., Pa.

Apparatus for manufacturing lime and cement and collecting carbon dioxide delivered therefrom. No. 2,112,502. Ogleby James McNitt, Miami, Fla.

Manufacture i-inositol by decomposition of phytin, decomposition being effected in alkaline solution of a concentration below that corresponding to 25% alkalinity. No. 2,112,553. Edw. Bartow and Wm. W. Walker, Iowa City, Ia.

Production homogeneous casein. No. 2,112,558. James R. Coffey to Louisville Drying Machinery Co., both of Louisville, Ky.

Preparation complex salts of zinc hydrosulfite and 1,2-aliphatic diamines. No. 2,112,567. Emeric Havas, Pitman N. J., to du Pont, Wilmington, Del.

Manufacture sulfuric acid by the contact process. No. 2,112,689. Fred Carl to du Pont, both of Wilmington, Del.

Catalytic hydrogenation of hydrofuramide to furfurylamine. No. 2,112,715. Caryl Sly to du Pont, both of Wilmington, Del.

Manufacture a hollow pellicle composed of a resinous, polymerized ester of an alpha-beta unsaturated acid, impregnated with liquid containing water and water-soluble solvent. No. 2,112,717. James E. Snyder, Lynbrook, N. Y., to du Pont, Wilmington, Del.

Method enhancing elasticity and softness of albuminous artificial stuffs; using compound of the formula $R\text{-}X\text{-}R_1(Y)_\pi$. No. 2,112,728. Stefan Morgenstern, Berlin-Charlottenburg, and Johann Eggert, Berlin, Germany, to Deutsche Hydrierwerke Aktiengesellschaft, Berlin-Charlottenburg, Germany.

Conversion olefines containing more than 2 carbon atoms in the mol. into the corresponding alcohols. No. 2,112,793. Herbert Muggleton Stanley, Tadworth, and James Ernest Youell, Wallington, England.

Solvent extraction oils, fats and other soluble constituents from materials containing same. No. 2,112,805. Michele Bonotto, Evansville, Ind., to Extractol Process, Ltd., Wilmington, Del.

Conversion alkaline earth sulfates to the corresponding carbonates. No. 2,112,903. Harold Simmons Booth, Cleveland Heights, O.

Thermal decomposition of oxy-compounds; contacting dolomite with a molten, inorganic compound. No. 2,112,904. Harold Simmons Booth, Cleveland Heights, O.

Manufacture highly porous alumina; first adding carbon black to solution of an aluminum salt. No. 2,112,931. Walter A. Schulze, Bartlesville, Okla., to Phillips Petroleum Co., corp. of Del.

Reversion of lower aliphatic amines. No. 2,112,970. Paul E. Millington, Milwaukee, Wis., to du Pont, Wilmington, Del.

Nitration of starch; mixing together dry powdered starch and nitrating acid containing nitric acid. No. 2,112,989. Johann Helle and Alfons Kunz, Fuzfo, Hungary, to Nitrokemia Ipartelepek Reszvenytarsasag, Budapest, Hungary.

Manufacture light-transforming screen or reflector, first dispersing in absence of a solvent a finely divided rhodamine dye in a solid, meltable synthetic resin. No. 2,113,090. Alfred H. McKeag and John T. Randall, Middlesex, England to General Electric Co., corp. of New York.

Manufacture dibenzyl disulfide. No. 2,113,092. Robert C. Moran, Wenonah, and Geo. S. Crandall, Woodbury, N. J., to Socony-Vacuum Oil Co., New York City.

Manufacture organic disulfides. No. 2,113,093. Robt. C. Moran Wenonah, and Geo. S. Crandall, Woodbury, N. J., to Socony-Vacuum Oil Co., New York City.

Process flue gas washing with the aid of a recirculated liquor to which a slurry of lime is continuously added. No. 2,113,198. Gordon Nonhebel and John Lindon Pearson, Norton-on-Tees, England, to Imperial Chemical Industries, London, England.

Stabilization oleo oil; adding and incorporating a quantity of hydrogenated refined soya bean oil and lecithin. No. 2,113,216. Harold S. Mitchell to Industrial Patents Corp., both of Chicago, Ill.

Sulfur purification process. No. 2,113,230. John B. Ceccon, San Francisco, Calif., to San Francisco Sulphur Co., corp. of Calif.

Production substituted amines by reacting one of the class of ammonia and primary and secondary amines with an alcohol in the vapor phase in contact with a catalyst at elevated temperature. No. 2,113,241. Elton B. Punnett, Buffalo, N. Y., to National Aniline & Chemical Co., New York City.

Production abietic alcohol. No. 2,113,243. Norman D. Scott, Sanborn, and Virgil L. Hansley, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Process of distilling a fluid mixture of organic compounds, at least one of which can be separated from the mixture by high vacuum distillation. No. 2,113,302. Kenneth C. D. Hickman, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Tungsten titanium carbide compound corresponding to formula $WTiC_3$. Nos. 2,113,353-4. Philip M. McKenna, Unity Township, Westmoreland Co., Pa.

Hard composition of matter; particles of the compound $WTiC_2$ cemented in a matrix. No. 2,113,355. Philip M. McKenna, Unity Township, Westmoreland Co., Pa.

Hard composition of matter; heating mixture of finely comminuted particles of the compound $WTiC_2$ and particles of metallic binder material under reduced pressure to temperature exceeding 1315°C. No. 2,113,356. Philip M. McKenna, Unity Township, Westmoreland Co., Pa.

Preparation liquid ungelled drying oil product; a jointly heat treated mixture of a gelling drying oil and at least one other drying oil. No. 2,113,358. Floyd M. Reece and Matthew F. Taggart, So. Bend, Ind.

Process bleaching ester type wax, using hydrogen peroxide alkaline solution. No. 2,113,433. Jos. S. Reichert, Donald J. Campbell, Wilbie S. Hinegardner, and LeRoy P. London, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Production butanol and acetone from molasses; inverting sucrose of the molasses and fermenting sterilized molasses by action of *Bacillus tetryl*. No. 2,113,471. Rafael Arroyo, Rio Piedras, P. R., to Lummus Co., New York City.

Culture for fermentation of monose sugars for production butanol and acetone, consisting of *Bacillus tetryl* in a substrate including an invert sugar. No. 2,113,472. Rafael Arroyo, Rio Piedras, P. R., to Lummus Co., New York City.

Treatment alkali earth carbonate material to obtain evolved gas in pure form. No. 2,113,522. Robt. S. Walker, Bellefonte, Pa., to Electro Lime & Ice Corp., Wilmington, Del.

Production unsaturated hydrocarbon gases. No. 2,113,536. John J. Grebe, Geo. Miller Hebbard, and Ralph E. Schneider to Dow Chemical Co., all of Midland, Mich.

Production resinous reaction products of sulfur dioxide and olefins. No. 2,113,584. Louis H. Fitch, Jr., and Fred E. Frey to Phillips Petroleum Co., all of Bartlesville, Okla.

Separation coarse heavy solid particles from coarse light particles in presence of a medium comprising a suspension of finely divided solid particles in liquid. No. 2,113,609. Charles Erb Wuensch, Joplin, Mo., to Wuensch Hetero Concentration Process Co., Wilmington, Del.

Continuous production manufacture amines with emulsions; forming stable emulsion of a lower alkyl halide and aqueous ammonia, then heating. No. 2,113,640. Cesare Barbieri and Joseph R. Heard, New York City; Heard assignor to Barbieri.

Regeneration polymerization catalysts comprising a phosphoric acid and an adsorbent material which has been contaminated with carbonaceous deposits. No. 2,113,654. Vladimir Ipatieff and Ben B. Corson to Universal Oil Products Co., all of Chicago, Ill.

Production sulfur-containing derivatives of higher fatty alcohols. No. 2,113,807. Richard Hueter, Rosslau-Anhalt, Germany, to Deutsche Hydrierwerke Aktiengesellschaft, Berlin-Charlottenburg, Germany.

Production carboxylic acids from nitrohydrocarbons. No. 2,113,812. Samuel B. Lippincott to Purdue Research Foundation, La Fayette, Ind.

Production carboxylic acids from nitrohydrocarbons. Nos. 2,113,813-4. Samuel B. Lippincott to Commercial Solvents Corp., both of Terre Haute, Ind.

Preparation pure titanium dioxide having rutile crystalline structure. Nos. 2,113,945-6. Walter W. Plechner, Piney River, Va., and Arthur W. Hixson, Leonia, N. J., to National Lead Co., New York City.

Method separating saturated components from mixtures of saturated and unsaturated components of higher aliphatic organic compounds derivable from the group of fats and waxes; first dissolving mixture in carbon disulfide. No. 2,113,960. Wolfgang Grote, Ernst Hundsdorfer, and Josef Moos to Edeleanu Gesellschaft m.b.H., all of Berlin, Germany.

Production sulfuric derivatives of higher alcohols. No. 2,114,042. Heinrich Bertsch, Chemnitz, Germany, to American Hyalsol Corp., Wilmington, Del.

Mixed esters of higher alcohols; mixture containing sodium salts of cetyl, oleyl and stearyl sulfates. No. 2,114,043. Heinrich Bertsch, Chemnitz, Germany, to American Hyalsol Corp., Wilmington, Del.

Preparation phenolic aralkyl-amino-alcohols. No. 2,114,122. Herman A. Bruson, Elkins Park, Pa., to Rohm & Haas Co., Phila., Pa.

Production amorphous, non-coalescent, non-gelatinous, precipitated silica in form of a white, impalpable powder, having larger pore size than a silica gel, characterized by its ability to absorb 100% or more of its weight of water from air saturated with moisture at ordinary temperatures. No. 2,114,123. Ralph V. Heuser, Mount Vernon, N. Y., to American Cyanamid Co., New York City.

Compound composed from polymer of mixture of ethyl alpha methacrylate and methyl acrylate. No. 2,114,233. Harry Trainor Neher, Bristol, and Charles Samuel Hollander, Holmesburg, Pa., to Rohm & Haas Co., Phila., Pa.

Apparatus for indicating oxidizing gases in aqueous liquids. No. 2,114,234. Georg Ornstein and Rudolf Kroke, both of Berlin, Germany.

Production sulfuric acid derivatives of higher molecular organic amines. No. 2,114,256. Otto Schenck, Dessau, Anhalt, Germany, to Deutsche Hydrierwerke Aktiengesellschaft, Berlin-Charlottenburg, Germany.

Purification beta-phenylethyl alcohol, containing an impurity which does not react with calcium chloride, to form an insoluble double compound. No. 2,114,286. Joseph W. Britton to Dow Chemical Co., both of Midland, Mich.

Production high molecular weight polymeric products; reacting sulfur dioxide with unsaturated compounds from the group of vinyl and allyl chlorides. No. 2,114,292. Frederick E. Frey, Louis Henry Fitch, Jr., and Robert Dewey Snow, Bartlesville, Okla.; First National Bank in Bartlesville, administrators of said Louis Henry Fitch, deceased, to Phillips Petroleum Co., a corp. of Del.

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Process for accelerated maturing of distilled spirits using finely divided activated carbon in process. No. 2,114,331. Kenneth R. Brown, Tamaqua, Pa., to Atlas Powder Co., Wilmington, Del.

Production alcohol from a liquid phase, including as equilibrium components water, sulfuric acid, and olefine material. No. 2,114,463. Benjamin T. Brooks, Stamford, Conn., to Standard Alcohol Co., Wilmington, Del.

Production nitrocellulose solutions; first dissolving nitrocellulose carrying water in a volatile solvent which is immiscible with water. No. 2,114,491. Cleveland B. Hollabaugh to Hercules Powder Co., both of Wilmington, Del.

Manufacture acetels by reacting acetylene with alcohol in presence of a catalyst and in acid medium. No. 2,114,676. Angelo Contardi and Baldo Ciocca, Milan, Italy.

Manufacture maleic acid and anhydride. No. 2,114,798. Harold B. Foster, Williamsville, N. Y., to National Aniline and Chemical Co., Inc., New York City.

Recovery solvent vapor from air by means of a plurality of activated carbon adsorbents. No. 4,114,810. Arthur B. Ray, Bayside, N. Y., to Union Carbide & Carbon Corp., New York City.

Controlled concentration of aqueous solutions of one or more of the lower fatty acids by extraction of one part of the solution with two parts of two or more lower alkyl esters of said acid. No. 2,114,825. Theodore O. Wentworth to Vulcan Copper & Supply Co., both of Cincinnati, O.

Purification and stabilization of a non-acidic ester of an inorganic acid containing free hydrogen halide. No. 2,114,866. Thomas H. Vaughn, Niagara Falls, N. Y., to Carbide & Carbon Chemicals Corp., New York City.

Leather

In a tanning process, treating hides with vegetable tanning solution, neutralizing acidity with magnesium carbonate. No. 2,111,800. Theo F. Oberlander, Elkland, Pa.

Treatment untanned hides and skins with salts of basic compounds. No. 2,111,823. Christoph Thomsen, Alfred Eckelmann, and Ernst Koch, to I. G., all of Frankfort-am-Main, Germany.

Treatment hides and skins with salts of basic compounds. No. 2,112,508. Christoph Thomsen, Alfred Eckelmann, and Ernst Koch, to I. G., all of Frankfort-am-Main, Germany.

Treatment animal skins and hides for preservation; incorporating into raw, unsalted hides water insoluble organic hydrocarbons which are in the liquid state, emulsified by action of an emulsifying agent. No. 2,113,799. Robert Muller, Hamburg, Germany.

Metals, Alloys, Ores

Refining non-ferrous metals. No. 2,111,575. James R. Stack, New Dorp, S. I., N. Y., to Nassau Smelting & Refining Corp., New York City.

Recovery of precious metal values from ores. No. 2,111,600. Louis D. Mills and Thomas B. Crowe, Palo Alto, and Joye C. Haun, San Francisco, Calif., to Merrill Co., San Francisco, Calif.

Treatment sulfide ores. No. 2,111,789. Chas. R. Kuzell, Clarkdale, Ariz., to Phelps Dodge Corp., New York City.

Process galvanizing ferrous metal. No. 2,111,826. Adolph H. Waltman and Paul W. Dillon, to Northwestern Barb Wire Co., all of Sterling, Ill.

Manufacture low phosphorus steel from blown Bessemer metal. No. 2,111,893. Clarence D. King, Brooklyn, N. Y., to U. S. Steel Corp., New York City.

Extraction copper-zinc-silver contents of an ore; first chloridizing-roasting and leaching ore in Longmaid-Henderson manner. No. 2,111,951. Alfred M. Thomsen, San Francisco, Calif.

Manufacture ferro-magnetic sheet material containing silicon, and having improved electrical properties. No. 2,112,084. Albert A. Frey, Wilkinsburg, Pa., and Francis Bitter, Cambridge, Mass., to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Apparatus for making tungsten carbide castings. No. 2,112,110. Orrin F. Marvin to Mills Alloys, Inc., both of Los Angeles, Calif.

Purification metallic cadmium containing zinc; treating impure cadmium with caustic soda. No. 2,112,191. Adolphe Denis Henri Leon Fassotte, Neerpelt, and Rene Favre, Overpelt, Belgium, to Compagnie des Metaux d'Overpelt-Lommel et de Corphalie Societe Anonyme, Overpelt-lez-Neerpelt, Belgium.

Recovery precious metals from ores. No. 2,112,299. Louis D. Mills and Thos. B. Crowe, Palo Alto, and Joye C. Haun, San Francisco, Calif., to Merrill Co., San Francisco, Calif.

Copper alloy base and welding rod; alloy composed of copper, tin, iron, silicon, and zinc. No. 2,112,373. Arthur R. Lytle, Niagara Falls, N. Y., to Oxweld Acetylene Co., corp. of N. Y.

Preparation finished ferrous metal sheet stock for galvanizing; annealing unpickled stock in an atmosphere containing sulfur dioxide and sulfur trioxide. No. 2,112,468. Malcolm E. Morgan, Gadsden, Ala., to Republic Steel Corp., Cleveland, O.

Production high manganese rustless irons and steels in an electric arc furnace. No. 2,112,485. Alex. L. Feild to Rustless Iron & Steel Corp., both of Balto., Md.

Production metallic iron in the rotary tube kiln. No. 2,112,566. Alex. Hasselbach to G. Polysius, Aktiengesellschaft, both of Dessau, Germany.

Production metal catalysts. No. 2,112,643. Walter Baensch, Mulheim-am-Ruhr, Germany, and Wolfgang Klaphake, Elsternwick, Australia.

Production alloys of magnesium and aluminum, using hydrogen peroxide in process. No. 2,112,703. Alex. Luschenowsky, Berlin, Germany.

Elimination iron and other impurities from caustic soda. No. 2,112,813. Domingo Lopez, Charleston, W. Va., to Westvaco Chlorine Products Corp., New York City.

Recovery titanium values from titaniferous ores; using sulfuric acid in process. No. 2,112,966. Ignace J. Krchma, Elmhurst, Del., to du Pont, Wilmington, Del.

Production highly permeable ferromagnetic alloy consisting of Ni, Fe, Mo, and copper. No. 2,112,971. Hans Neumann, Berlin-Siemensstadt, Germany, to Siemens and Halske, Aktiengesellschaft, Siemensstadt, near Berlin, Germany.

Manufacture aluminum alloys. No. 2,113,021. Chas. T. Greenidge, Milwaukee, and Samuel L. Hoyt, Shorewood, Wis.

Method roasting coarse metal sulfide ore. No. 2,113,058. Edwin J. Mullen, New Rochelle, N. Y., to General Chemical Co., New York City.

Manufacture a hard, sintered tungsten carbide. No. 2,113,171. Hugh S. Cooper to Cooper Products, Inc., Cleveland, O.

Oxyacetylene welding rod; metallic member carrying flux consisting of sodium carbonate, borax, carbon, ferro-silicon, gelatine, silicate. No. 2,113,222. Willy Rochocz to Jack Greenbaum, both of Balto., Md.

Copper-silicon-iron base alloy characterized by good machining properties in addition to inherent high tensile strength, ductility, good hot or cold working properties, etc. No. 2,113,283. Benoit J. Sirois, Elizabeth, N. J., to Phelps Dodge Copper Products Corp., New York City.

Removal tin from a lead or alloys of lead. No. 2,113,643. Jesse O. Betterton and Albert J. Phillips, Metuchen, N. J., to American Smelting and Refining Co., New York City.

Production high manganese rustless irons and steels in an electric arc furnace. No. 2,113,880. Alexander L. Feild to Rustless Iron and Steel Corp., both of Balto., Md.

Method uniting adjacent edges of ferritic chromium steel articles containing chromium and carbon, depositing between edges molten weld filler metal. No. 2,113,937. Russell Franks, Niagara Falls, N. Y., to Union Carbide & Carbon Corp., corp. of New York.

Magnetic alloy characterized by addition of tin to improve its magnetic qualities; made from iron, nickel, tin, chromium, titanium, silicon, and manganese. No. 2,114,109. Kotaro Honda and Tomotsu Nishina, Sendai, Japan.

Production electrolytic copper. No. 2,114,161. Frank L. Antisell, Wilkinsburg, Pa., to Copperweld Steel Co., Glassport, Pa.

Manufacture a nickel-iron magnetic material. No. 2,114,183. Carl Haase, Berlin-Mahlsdorf-Sud, and Otto Dahl, Berlin-Friedenau, Germany, to General Electric Co., corp. of New York.

Bearing metal composed of copper, lead, and magnesium. No. 2,114,629. William E. McCullough to Bohn Aluminum & Brass Corp., both of Detroit, Mich.

Production metallic layers. No. 2,114,665. Bernhard Loewe, Berlin, Germany.

Welding and brazing alloy composed of copper, zinc, nickel and cobalt. No. 2,114,781. Hans Kanz, Zurich-Albisrieden, Switzerland.

A nitride hardened steel alloy consisting of zirconium, chromium, manganese, silicon, and iron. No. 2,114,802. Augustus B. Kinzel, Beechhurst, N. Y., to Union Carbide & Carbon Corp., New York City.

Manufacture steel subject to continued creep stress at elevated temperatures and free from banding or dendritic segregation. No. 2,114,868. LeRoy L. Wyman, Schenectady, N. Y., to General Electric Company, a corp. of N. Y.

Packing member for use in contact with a metal member, made of corrodible material of the iron type and in presence of water, comprising packing material including a lubricated asbestos fibre composition and an agent to increase electronegativity. No. 2,114,923. Ralph T. Halstead, Somerville, N. J., to Johns-Manville, New York City.

Naval Stores

Production hydrogenated wood rosin, unsaturation of which has been reduced by at least 50% of theoretical for two double bonds of its unsaturated rosin acids by combination with hydrogen. No. 2,113,808. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Method refining rosin ester by removal of color bodies therefrom; extracting solution of ester by means of a selective solvent. No. 2,114,371. Joseph N. Borglin to Hercules Powder Co., both of Wilmington, Del.

Plasticized pine wood pitch characterized by low solubility in petroleum hydrocarbons; mixture of a natural glyceride and a petroleum hydrocarbon-insoluble resin. No. 2,114,392. Fred H. Lane, Hillsdale, N. Y., to Hercules Powder Co., Wilmington, Del.

Paper and Pulp

Manufacture glassine, greaseproof or imitation parchment paper containing modifying materials. No. 2,112,540. Frank J. McAndrews and Lester Long to Chas. McDowell, trading as McDowell Paper Mills, all of Phila., Pa.

Process deinking paper. No. 2,112,562. Harry C. Fisher, Cincinnati, O., to Gardner-Richardson Co., Middletown, O.

Manufacture safety paper; using treating substance composed of a reducible inorganic salt resistant to decomposition by light and which upon reduction forms substance of different color than the original salt. No. 2,112,756. Viktor T. Bausch, Berlin, and Adolf Schroth, Neu-Kaliss, Mecklenburg, Germany, to Felix Scholler & Bausch, Mecklenburg, Germany.

Improved method paper manufacture; using during process an alkaline dispersion of a tough starch produced by treating a raw starch with formaldehyde and an acid catalyst. No. 2,113,034. Ben W. Rowland, Appleton, Wis., and Jordan V. Bauer, Chicago, Ill., to Stein, Hall Mfg. Co., Chicago, Ill.

Process and apparatus for manufacture paper products. No. 2,113,297. Henry A. Ellis, Sharonville, and Wm. A. Slattery, Hamilton, O., to Philip Carey Mfg. Co., corp. of Ohio.

Production filled and sized paper; filler containing calcium carbonate; sizing including alum; permitting calcium carbonate and alum to react to limited extent to produce CO_2, and preventing escape of latter from mixture so as to maintain mixture at a pH not above 7.0. No. 2,114,809. Francis G. Rawling, Piedmont, W. Va., to West Virginia Pulp & Paper Co., New York City.

Petroleum Chemicals

Refining a viscous hydrocarbon oil by contacting same with a strong sludge-forming mineral acid in presence of a liquid, non-viscous, saturated hydrocarbon diluent. No. 2,111,548. Malcolm L. Berry, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Thermal decomposition of hydrocarbons. No. 2,111,717. Rex Young, Grandfield, Okla., to Max G. Cohen, Tulsa, Okla.

Hydrocarbon separating apparatus. No. 2,111,718. Rex Young, Grandfield, Okla., to Max G. Cohen, Tulsa, Okla.

Recovery of a solvent from an oil fraction dissolved in said solvent. No. 2,111,822. Frederick W. Sullivan, Jr., Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Refining mineral oils, characterized by a high content of high boiling aromatic and naphthenic hydrocarbons, extracting oil with mixture of aniline and benzol. No. 2,111,864. Arthur L. Lyman, Berkeley, Calif., to Standard Oil Co. of Calif., San Francisco, Calif.

Separating an acid sludge which is to be stored for a period of time and has been produced by treating a petroleum oil with concentrated sulfuric acid. No. 2,111,920. Alfred A. Wells, Roselle Park, N. J., to Standard Oil Development Co., corp. of Del.

Method depropanizing a cold mixture of propane and a high boiling point hydrocarbon. No. 2,111,957. Daniel B. Banks, Drexel Hill, and Paul D. Barton, Narberth, Pa., to Sun Oil Co., Phila., Pa.

Hydrocarbon oil treatment. No. 2,111,968. Seymour W. Ferris, Aldan, Pa., to Atlantic Refining Co., Phila., Pa.

Inhibiting corrosion of corrodible metals when contacted with light liquid hydrocarbons containing constituents corrosive to said metals; adding to hydrocarbons a mercapto aryl thiazole. No. 2,111,990. James A. Reid and Graham H. Short, Bartlesville, Okla., to Phillips Petroleum Co., corp. of Del.

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Pigments, Dry Colors and Fillers

Manufacture iron oxide pigments from metallic iron. Nos. 2,111,726-7. Geo. Plews, Berkeley, Calif., to C. K. Williams & Co., Easton, Pa.

Manufacture an oil color from a wet pigment; emulsifying pigment and water with oil and breaking emulsion to separate oil and pigment from water; using water-soluble soap in process. No. 2,112,222. Arthur John Schroeder, Cincinnati, O., to Interchemical Corp., corp. of Ohio.

Manufacture calcium sulfate-zinc sulfide pigments. No. 2,112,357. Keith H. Butler, Elmhurst, Rodolphe A. Gagnon, Marshallton, Del., and Jas. D. Prince, Linthicum Heights, Md., to du Pont, Wilmington, Del.

Production non-coalesced composite pigment, comprising pigment from the group of titanium dioxide and white insoluble titanates, and as an extender a fluoride of an index of refraction less than about 1.44. No. 2,113,380. James B. Nichols to du Pont, both of Wilmington, Del.

Non-coalesced composite pigment, comprising pigment zinc sulfide and a difficultly water-soluble fluorine compound extender, said pigment being suitable for use in an opaque non-aqueous coating composition. No. 2,113,381. James B. Nichols, to du Pont, both of Wilmington, Del.

Production pigments of improved wetting, dispersing, and non-settling characteristics. No. 2,113,539. Walter F. Meister, Elizabeth, N. J., to United Color & Pigment Co., Newark, N. J.

Preparation pigments for enamels, lacquers, inks, etc.; using in process wet cellulose nitrate, an aqueous emulsion of blown castor oil, an emulsifying agent, and an organic acid. No. 2,114,713. Robert Tyler Hucks, South River, and George Raymond Maher, New Brunswick, N. J., to du Pont, Wilmington, Del.

Carbon pigment producing furnace. No. 2,114,738. George L. Heller, Pampa, Tex., and Harold M. Wilgus, Merrick, N. Y., to General Atlas Carbon Co., Dover, Del.

Resins, Plastics, etc.

Cast resinous product of the urea-formaldehyde type, containing sorbitol. No. 2,111,622. Rudolph Max Goepp, Jr., Tamaqua, Pa., to Atlas Powder Co., Wilmington, Del.

Organic solvent soluble resinous composition compatible with cellulose acetate and nitro-cellulose, being reaction product of diethylene glycol, oxalic acid, and maleic adduct of tung oil. No. 2,111,762. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Condensation products having very high alkali resistance. No. 2,112,-022. Herbert Honel, Vienna, Austria, to Helmuth Reichhold (Reichhold Chemicals), Detroit, Mich.

Process and apparatus for condensation of sublimate material selected from group of phthalic anhydride, benzoic acid, naphthalic anhydride, and beta naphthol, from vapors containing it. No. 2,112,024. Carl H. B. Jarl and Sten Sverin, Royal Oak, Mich., to Beck, Koller & Co., Detroit, Mich.

Manufacture compatible compositions of urea-formaldehyde condensation product and polyhydric alcohol-polybasic acid resin modified with a fatty oil. No. 2,112,556. James B. Bullitt, Jr., Swarthmore, and Donald E. Edgar, Phila., Pa., to du Pont, Wilmington, Del.

Resinous reaction products; a high molecular weight heteropolymeric compound consisting of sulfur dioxide and two or more aliphatic olefins, having a carbon content of from 3 to 6 carbon atoms per mol., and differing from each other in molecular weight and number of carbon atoms per mol. No. 2,112,986. Frederick E. Frey and Robert D. Snow, Bartlesville, Okla., to Phillips Petroleum Co., corp. of Del.

Preparation a synthetic wax resin pour point depressor, by condensation of a mixture of chlorinated wax and an aromatic hydrocarbon in presence of aluminum chloride. No. 2,113,179. Webster B. Kay to Standard Oil Co., both of Chicago, Ill.

Manufacture laminated material composed of superposed layers of artificial silk bonded together with synthetic resin. No. 2,113,434. Hans Schuhmann, Berlin-Frohnau, Germany, to General Electric Co., corp. of N. Y.

Manufacture resinous condensation products in which condensation of a carbamide with an aldehyde is carried out in alkaline solution in presence of a compound containing interconnected sulfur atoms. No. 2,113,-485. Ignaz Kreidl, Vienna, Austria.

Brake lining, clutch facing and the like element, including a frictional filler in discrete particles and a binder comprising condensation product of an aldehyde with an alkene-phenol. No. 2,114,121. Howard L. Bender, Bloomfield, N. J., to Bakelite Corp., New York City.

Manufacture resin coated abrasive grains. No. 2,114,229. Harry C. Martin and Frederick A. Upper to Carborundum Co., all of Niagara Falls, N. Y.

Manufacturing printing plate composed of type areas of molded resin adhering to a metal carrier sheet. No. 2,114,288. Arthur B. Davis, Springfield, Ohio.

Molding composition comprising an inert porous filler and a binder including a gummy adhesive and a dissolved cellulose derivative. No. 2,114,300. Lester C. Gustin, Winchester, and Richard F. Hoflin, Cambridge, Mass.; Hoflin to Gustin.

Production porous, fibrous material impregnated with a resin, comprising esterified pine wood resin produced by extracting resinous wood with a coal tar hydrocarbon. No. 2,114,393. Fred H. Lane, Hillsdale, N. Y., to Hercules Powder Co., Wilmington, Del.

Process and apparatus for production of hollow bodies from cellulose products and other plastic masses. No. 2,114,794. Kurt Bratring, Berlin, Germany, to International Containers, Ltd., London, England.

Production petroleum resin in form of a viscous liquid, derived from residue resulting from solvent treatment of hydrocarbon oil which has not been subjected to cracking or chemical treatment. No. 2,114,796. Everett H. Crawley, Louisville, Ky.

Hard, tough, abrasion- and moisture-resistant resinous composition; the heat-treated residual product of heating a solution containing furfural and a reaction product of an aldehyde with hydrolyzed polymerized vinyl ester. No. 2,114,877. Ralph W. Hall, Fort Wayne, Ind., to General Electric Co., a corp. of N. Y.

Grease retainer, including a flexible packing element, and an annular synthetic resin support for same. No. 2,114,908. Ruben O. Peterson, Glen Ellyn, Ill., to Victor Mfg. & Gasket Co., Chicago, Ill.

Rubber

Method forming rubberized sheet material; in one step impregnating fibrous material with a coagulant to initiate deposition of rubber particles, then applying aqueous dispersion of rubber. No. 2,111,933. Edw. F. King, Cranston, R. I.

Manufacture microporous vulcanized hard rubber article. No. 2,112,529. Eardley Hazell to U. S. Rubber Co., both of New York City.

Rubber swelling process; adding phosphatides to liquid swelling agent, and combining resultant mixture with the rubber. No. 2,112,802. Johannes Behre, Hamburg-Klein-Borstel, Germany, to Lehmann & Voss & Co., Hamburg, Germany.

Reclamation vulcanized rubber; adding phosphatides to the vulcanized rubber and heating mixture in presence of steam. No. 2,112,803. Johannes Behre, Hamburg-Klein-Borstel, Germany, to Lehmann & Voss & Co., Hamburg, Germany.

Production amorphous rubber hydrochloride, characterized by its stability against change into a crystalline state. No. 2,112,987. Erich Gebauer-Fuelnegg, deceased, late of Evanston, Ill., by Marie Gebauer-Fuelnegg, administratrix, Evanston, Ill., and Eugene W. Moffett, Chicago, Ill., to Marbon Corp., corp. of Del.

Process forming rubber thread, first bringing latex and coagulent together to form a tape. No. 2,113,498. Thos. Lewis Shepherd, London, England.

Method making latex rubber article having a skin-like roughened surface. No. 2,114,162. Carl L. Beal, Cuyahoga Falls, Ohio, to American Anode, Inc., Akron, Ohio.

Continuous formation foam of compounded aqueous rubber dispersions; admixing and foaming mixture of aqueous rubber dispersion and air. No. 2,114,275. Edward Arthur Murphy and Evelyn William Madge, Wylde Green, Birmingham, Stanley Douglas Taylor, Sutton Coldfield, and Donald Withworth Pounder, Moseley, Birmingham, England, to Dunlop Rubber Co., Ltd., London, England.

Abrasive article made from abrasive grains and bonded with a hardened rubber derivative. No. 2,114,636. Charles S. Nelson to Carborundum Co., both of Niagara Falls, N. Y.

Textile, Rayon

Preparation hydrophobic cellulose fibers by impregnating them with bath containing water-soluble salts of amines, a low molecular compound containing several amino groups and an aliphatic aldehyde, then heating. No. 2,111,698. Fritz Siefert, Oppau, and Jos. Stadler, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Preparation yarns and filaments composed of an organic acid ester of cellulose for textile operations, applying to same a conditioning fluid containing an oil and diethylene glycol monoethyl ether acetate. No. 2,112,-117. Edwin A. Robinson, Elizabeth, N. J., and Graham M. Richardson, Kingsport, Tenn.

Fabric comprising warp and woof threads, one being of cellulose acetate. No. 2,112,123. Ashton M. Tenney, New Rochelle, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Method treating dyed fabrics to avoid facing marks; spraying same with liquid solution or emulsion of a mold oxidizing reagent. No. 2,112,132. Geo. E. Bennett, East Providence, R. I., to Sayles Finishing Plants, Saylesville, R. I.

Manufacture artificial filaments, yarns, etc., from solutions of organic derivatives of cellulose. No. 2,112.236. Wm. Alex. Dickie, Spondon near Derby, England, to Celanese Corp. of America, corp. of Del.

Treatment artificial threads, yarns, etc., having basis of organic derivatives of cellulose; treating same with an acidic softening medium. No. 2,112,237. Henry Dreyfus, London, England.

Saponification filaments, etc., composed of organic esters of cellulose; treating same with bath containing an alkaline saponifying agent and a salt of said agent with an aromatic substance of a weakly acid reaction. No. 2,112,275. Henry Dreyfus, London, England.

Manufacture textile materials formed of mixture of wool and artificial fibers containing an organic ester of cellulose, so that both may be dyed with a direct cotton dyestuff. No. 2,112,303. Herbert Platt, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Treatment viscose threads having a dry tenacity but low extensibility; subjecting same to action of a caustic alkali solution. No. 2,112,499. Leon Lilienfeld, Vienna, Austria.

Treatment cellulose ester materials; subjecting same to action of a current of a vaporous deesterifying agent free of moisture at temperature above 100°C. No. 2,112,883. Henry Dreyfus, London, England.

Production transparent effects on fabrics; printing on same parchmentizing mass comprising concentrated solution of zinc chloride in which a cellulosic thickening agent is dissolved. No. 2,112,895. Geo. Heberlein, Jr., Wattwil, Wanne, and Ernst Weiss, Wittwil, Switzerland, to Heberlein Patent Corp., New York City.

Process for softening and finishing cellulose fibers; treating same with dilute aqueous acetone solution of glycerine mono-palmitate mono-oleate. No. 2,113,325. Theodoor Koch, Oosterbeek, Netherlands, to American Enka Corp., Enka, N. C.

Bleaching viscose yarn in presence of metallic aluminum (bobbins) in an alkaline solution of a hypochlorite, incorporating a sulfonated oil to inhibit corrosion of the aluminum. No. 2,113,453. Winfred M. Mitchell and Edw. Huffman, Rome, Ga., to Tubize Chatillon Corp.

Production textiles containing filaments of organic derivatives of cellulose; said material which, when dyed, exhibits colored pattern effects by virtue of the reduced dye affinity of the heat-treated portions. No. 2,113,935. Camille Dreyfus, New York City, and Herbert Platt and Arthur Lyem, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Treatment yarns containing staple fibers; softening any beard on yard by application of a liquid which has a softening action. No. 2,113,955. George Crawford Tyce, Belper, England, to Celanese Corp. of America, corp. of Delaware.

Method waterproofing textiles composed of yarns of cellulose organic derivatives; superposing on textile a film or foil consisting of a cellulose organic derivative and subjecting to temperature of about 95°C. and pressure of about 150 lbs. No. 2,114,320. George Schneider, Montclair, N. J., to Celanese Corp. of America, corp. of Del.

Treatment fibrous materials; subjecting same to action of a dye bath containing substance yielding surface active cations, then applying a soluble resin acid radical compound reacting with cation active substance to produce a water insoluble precipitate. No. 2,114,564. Walter Kling and Ernst Gotte to Boehme Fettchemie-Gesellschaft m. b. H., all of Chemnitz, Germany.

Water, Sewage Treatment

Sterilization water by conjoint action of chlorin and ammonia. No. 2,112,476. Herbert L. Bowers and Ray Riley, Long Island City, N. Y., to Permutit Co., New York City.

Treatment contaminated water; passing water through a filter bed of alkaline earth carbonate in granular form, filtering, then adding to flow a metal salt forming in the water a hydrated oxide gel coagulant. No. 2,114,576. Edward P. Schinman to Permutit Co., both of New York City.

Method continuously flocculating and settling out colloidal matter from a stream-flow of sewage. No. 2,114,601. William C. Laughlin, Kew Gardens, N. Y., to Filtration Equipment Corp., New York City.